

EXHIBIT B



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Court Reporting and
Litigation Services

James T. Wells, Ph.D.

October 17, 2019

Pamela Butler, et al.

vs.

Mallinckrodt, Inc., et al.

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF MISSOURI
EASTERN DIVISION

-----x
PAMELA BUTLER, et al.)
Plaintiffs,) No. 4:12-CV-00361-AGF
v.) Lead Case
MALLINCKRODT, INC.,)
et al.,)
Defendants.)
-----x

VIDEOTAPED DEPOSITION OF JAMES T. WELLS, Ph.D.

LOS ANGELES, CALIFORNIA

THURSDAY, OCTOBER 17, 2019

9:05 A.M.

Job No.: 213918

Pages: 1 - 343

Reported by: Leslie A. Todd, CSR #5129 and RPR

1 Deposition of JAMES T. WELLS, Ph.D., held
2 at the offices of:

3

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5 MORGAN, LEWIS & BOCKIUS, LLP

6 300 South Grand Avenue

7 22nd Floor

8 Los Angeles, California 90071

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14 Pursuant to notice, before Leslie Anne Todd,
15 Court Reporter No. 5129 in and for the State of
16 California, who officiated in administering the
17 oath to the witness.

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1 A P P E A R A N C E S

2

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1 A P P E A R A N C E S (Continued)

2

3 ALSO PRESENT:

4 ARTHUR S. ROOD, MS

5 (Risk Assessment Corporation)

6 PETER KALISCH, Videographer

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1 P R O C E E D I N G S

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3 THE VIDEOGRAPHER: We are on the record.

4 This is the videotaped deposition of Dr. James
5 Wells. Today's date is October 17, 2019, and the
6 time is 9:05 a.m.

7 This is the case of Pamela Butler,
8 et al., versus Mallinckrodt, Inc., et al. The
9 case number is 4:12-CV-00361-AGF pending in the
10 United States District Court for the Eastern
11 District of Missouri, Eastern Division. This
12 deposition is being held at Morgan, Lewis and
13 Bockius, LLP, at 300 South Grand Avenue, 22nd
14 Floor, Los Angeles, California 90071.

15 My name is Peter Kalisch, the
16 videographer, associated with Pohlman USA Court
17 Reporting, located at 10 South Broadway,
18 Suite 1400, St. Louis, Missouri. The court
19 reporter is Leslie Todd, also with Pohlman USA
20 Court Reporting.

21 Counsel, will you please state your
22 appearances.

23 MR. McCLAIN: On behalf of the
24 plaintiffs, Ken McClain.

25 MR. ZAGER: Jason Zager on behalf of

1 Mallinckrodt, Inc.

2 MR. SODEN: Steve Soden on behalf of
3 Mallinckrodt.

4 MR. MCGAHREN: John McGahren on behalf
5 of Cotter Corporation.

6 THE VIDEOGRAPHER: Will the court
7 reporter swear in the witness, please.

8 JAMES T. WELLS, Ph.D.,
9 and having been first duly sworn,
10 was examined and testified as follows:

11 EXAMINATION

12 BY MR. ZAGER:

13 Q Sir, would you please state your name
14 for the record.

15 A My names is James Wells.

16 Q And you are a Ph.D., correct?

17 A Correct.

18 Q Dr. Wells, you understand that you've
19 been retained as an expert for the plaintiffs in
20 this case?

21 A I understand that, yes.

22 Q And are you here to testify regarding
23 your two expert reports that you have authored in
24 this particular case?

25 A Yes.

1 Q Okay. I understand you've given some
2 depositions before; is that correct?

3 **A I have.**

4 Q Given that you're experienced in this
5 process, I'll kind of dispense with the normal
6 ground rules that we talk about with witnesses.
7 The one thing that I would just remind you is if
8 at any point in time I ask a question that you
9 don't understand or if I use a term that you don't
10 understand, will you please let me know?

11 **A Yes, I will.**

12 Q Do you understand that if I ask a
13 question or if one of the other attorneys ask a
14 question and you provide an answer, that someone
15 reviewing the transcript, whether it's the jury or
16 the judge, is going to believe that you understood
17 the question and provided a responsive answer?

18 **A Okay. I understand that.**

19 **(Exhibit No. 1 was marked for**
20 **identification.)**

21 BY MR. ZAGER:

22 Q Sir, I'm going to hand you what I've
23 marked as Exhibit 1. Go ahead and take a look at
24 that and tell me if you recognize that document.

25 **A Yes, I do recognize this document.**

1 Q What do you recognize Exhibit 1 to be?

2 A I recognize this to be the notice for
3 this deposition.

4 Q If you turn to the last page of
5 Exhibit 1, there's Exhibit A that asks for you to
6 bring certain documents with you to the
7 deposition.

8 Do you see that?

9 A I do.

10 Q Have you reviewed the Exhibit A to
11 Exhibit 1?

12 A I have.

13 Q Have you brought the documents with you
14 today that are requested here?

15 A Well, I believe that certain technical
16 documents have already been provided. So I did
17 bring some documents with me today that I -- I
18 think you have not received thus far.

19 Q Okay. The technical documents you're
20 referring to, were those all produced in
21 discovery, to your understanding?

22 A To my understanding, yes.

23 Q Are the technical documents that were
24 produced in discovery all identified in your
25 reports in your footnotes?

1 **A Yes, they are.**

2 Q You did not bring those with you today,
3 fair?

4 **A That's correct, I didn't.**

5 Q The documents that you brought with you
6 today, I believe first you brought your invoices,
7 correct?

8 **A Correct.**

9 Q All right. We'll talk about those in a
10 little bit more detail later.

11 You also brought a copy of, I believe,
12 your signed confidentiality agreement?

13 **A That's right.**

14 Q You brought a copy of a contract, I
15 believe, between you and Mr. McClain's firm,
16 although I think you said it wasn't signed yet,
17 fair?

18 MR. McCLAIN: Well, that copy is not
19 signed, but I was saying that I don't know whether
20 there is a signed copy, but --

21 MR. ZAGER: Okay.

22 THE WITNESS: The copy I brought wasn't
23 signed. I couldn't find a signed copy. I
24 actually think there is one, but I couldn't find
25 it as I was gathering these documents yesterday.

1 MR. McCLAIN: I don't know whether there
2 is or not. I was just --

3 THE WITNESS: That's fair.

4 MR. McCLAIN: -- giving a bad joke
5 for -- from an expert's point of view.

6 BY MR. ZAGER:

7 Q Did you, I believe, also bring two
8 copies -- or a copy of each of your reports, fair?

9 A I did.

10 Q Okay. Did you bring any other documents
11 with you here today?

12 A No, I didn't.

13 Q Did you make any notes while you were
14 working on this case?

15 A To some degree I made notes in that --
16 that as I was beginning to write my report, I --
17 the way I usually write a report is I'll develop
18 sort of like a written outline, and then I fill in
19 that outline. So there are -- there -- along the
20 way, the draft of the report started out kind of
21 as a skeletal outline and then continued until it
22 was the complete report.

23 Q Did you make any handwritten notes while
24 you were working on this case?

25 A I don't think so.

1 Q You mentioned the technical documents.

2 Did you print out any of the technical documents?

3 A Yes, I did print out some of the
4 technical documents.

5 Q Did you make any handwritten notes or
6 highlights in the margins on the technical
7 documents that you printed out?

8 A I don't believe so.

9 Q Okay. So other than the technical
10 documents which we've already discussed, you
11 believe that you brought everything that you have
12 that's responsive to Exhibit A to the Exhibit 1,
13 your deposition notice, fair?

14 A I believe that's fair. Just -- I'll
15 just note item number 12 is my current resume, and
16 that's attached to the first of my reports.

17 Q Okay. All right. We may come back to
18 that at some point, but you can set that aside for
19 now.

20 A Okay.

21 Q You told us that your CV is actually
22 attached to your first report, correct?

23 A Yes.

24 (Exhibit No. 2 was marked for
25 identification.)

1 BY MR. ZAGER:

2 Q I'm going to hand you what I marked as
3 Exhibit 2.

4 Go ahead and take a look at that.

5 **A (Peruses document.)**

6 Q Do you recognize Exhibit 2?

7 **A I do recognize this.**

8 Q What is Exhibit 2?

9 **A Exhibit 2 is a copy of my first expert**
10 **report in this case dated March 31st, 2019.**

11 Q Okay. Does Exhibit 2 contain a copy of
12 your CV, as you mentioned?

13 **A Yes, it does.**

14 Q Let's go ahead and turn to that. I
15 believe it's Appendix A to Exhibit 2.

16 **A Yes.**

17 Q First, is there anything that needs to
18 be updated to this CV since it was provided with
19 your March 31st, 2019, report?

20 **A (Peruses document.)**

21 **The only thing that I see that I should**
22 **tell you about is I -- I actually did participate**
23 **in another deposition, actually just last week,**
24 **and that's obviously not listed here.**

25 Q Okay. What was the case that you gave

1 the deposition in last week?

2 **A Well, I call it the Wedron, Illinois**
3 **case. I'm not sure what the official title is.**

4 Q What type of case is the Wedron,
5 Illinois case?

6 **A It's a contamination case. It's a --**
7 **it's a case of soil and groundwater contamination**
8 **that spread on -- onto and under people's homes.**

9 Q The Wedron, Illinois case, does it
10 relate to any alleged contamination with
11 radioactive materials or radionuclides?

12 **A No, it doesn't.**

13 Q Okay. Other than adding the deposition
14 from the Wedron, Illinois case, is there anything
15 else that needs to be updated about your CV or
16 your testimony list?

17 **A I don't believe so.**

18 Q Okay. I know it's in the -- in the CV,
19 but why don't you just go ahead and give me your
20 educational background, a thumbnail sketch.

21 **A Okay. Well, I have a bachelor's in**
22 **earth sciences from Dartmouth College way back in**
23 **1981. And then my master's in geology and my**
24 **Ph.D. in geology are from the University of**
25 **Washington, and I finished up my graduate studies**

1 **in 1990.**

2 Q Your graduate studies were a Ph.D.?

3 **A Master's and Ph.D.**

4 Q You have a master's and Ph.D. and then
5 you --

6 I'm sorry, you have a master's in
7 geology, correct?

8 **A Correct.**

9 Q And you also have a Ph.D. in geology?

10 **A Correct.**

11 Q What coursework have you taken related
12 to radiation, if any?

13 **A I haven't taken any coursework**
14 **specifically related to radiation.**

15 Q Have you taken any courses in health
16 physics?

17 **A No.**

18 Q Have you taken any courses specific to
19 radiation safety?

20 **A No, I haven't.**

21 Q Okay. If you were to meet me at a
22 cocktail party, for instance, how would you
23 describe your line of work or your expertise?

24 **A I would describe myself as an**
25 **environmental geologist, and I would describe**

1 myself as an expert in contaminant fate and
2 transport.

3 Q What is contaminant fate and transport?

4 A Contaminant fate and transport broadly
5 is the study of how contaminants released to the
6 environment migrate, how they might spread from a
7 point of release out into the environment, into
8 groundwater, into soil, into surface water,
9 sediments, things like that.

10 Q In your work are there particular
11 contaminants that you normally work with?

12 A In my work we -- we really address any
13 contaminants that, you know, clients have a
14 problem with. I'm not, per se, a chemist but,
15 rather, an environmental geologist. So I'm -- I'm
16 the guy that's on the fate and transport side of
17 things.

18 Q When you work on a fate and transport
19 case like you just described, what does -- what do
20 you typically do? What are your duties?

21 A Well, it really all depends on the needs
22 of -- of our clients. But very broadly, my work
23 involves -- outside of litigation support,
24 involves evaluating and characterizing a site, so
25 trying to understand the nature and extent of

1 contamination at a site. Oftentimes it's
2 important to try to understand whether or not
3 contamination has spread off some particular
4 property where it might have originated.

5 And then we advise clients on how to
6 comply with the relevant regulations. And if
7 cleanup is necessary, we evaluate mediation
8 technologies and strategies that might be
9 appropriate for cleaning up the site.

10 Q Do you perform any dose reconstruction?

11 A No, I don't.

12 Q Okay. That would be the purview of a
13 toxicologist or some other expertise?

14 A I would agree with that.

15 Q Okay. You note on your CV your
16 professional societies that you're a member of.
17 Are you a member of any professional societies
18 that are specific to either radiation measurement
19 or radiation safety?

20 A No, I'm not.

21 Q Are you a member of the American Board
22 of Health Physics?

23 A No.

24 Q What about the Health Physics Society?

25 A No, I'm not.

1 Q You note that you're a licensed
2 geologist in the state of California?

3 **A Correct.**

4 Q Do you have any other licenses that you
5 believe are pertinent to this case?

6 **A No, I don't.**

7 Q Okay. You currently work for
8 L. Everett & Associates?

9 **A That's correct.**

10 Q How long have you been with L. Everett &
11 Associates?

12 **A Well, I -- I helped form that company**
13 **with my senior partner, Dr. Lorne Everett, about**
14 **nine years ago.**

15 Q Okay. So approximately 2010?

16 **A Correct.**

17 Q I'm sure this is probably going to touch
18 on what you've already told us, but what kind of
19 work does L. Everett & Associates perform?

20 **A The very kind of work I -- I discussed**
21 **earlier. We work on sites that have**
22 **contamination, either in soil or groundwater or**
23 **surface water. We conduct site characterization**
24 **activities to try to understand and better define**
25 **the nature and extent of contamination. We'll**

1 oftentimes work toward trying to understand the
2 source of contamination, because sometimes it's
3 not so obvious and sometimes there might be
4 multiple sources or multiple releases.

5 And then we try to guide our clients
6 through the regulatory process, so we interact
7 with regulatory authorities, either at the federal
8 or state or local level. That oftentimes involves
9 meetings and writing reports. And then if a site
10 is found to require cleanup, if the levels of
11 contamination are too high to be protective of
12 human health or the environment, we'll also engage
13 in remedial planning.

14 Q You mentioned that you do some
15 litigation work and you do non-litigation work.
16 Is that fair?

17 A That's fair.

18 Q Is there a breakdown in your work at
19 L. Everett & Associates between those? I mean, do
20 you do 20 percent one and 80 percent the other, or
21 what would be the ratio between those?

22 A I don't really have that in my mind in a
23 quantitative way, but I would say that probably
24 these days about 40 percent of my work is spent on
25 projects where I've been designated as an expert.

1 Q An expert witness in litigation.

2 A Right.

3 Q Okay. So you believe the -- currently
4 as you sit here today in October of 2019, the bulk
5 of your work is litigation work.

6 A Well, 60 percent is other kind of work,
7 so I wouldn't say the bulk is, but, you know,
8 40 percent is a fair amount.

9 Q Okay. You mentioned in your report that
10 when -- that you used the methodology in this
11 particular case that you use in your
12 non-litigation work. Do you recall saying that?

13 A Yes.

14 Q Explain to me what methodology you use
15 in your non-litigation work that you then apply to
16 this case.

17 A Well, one of the things I was looking at
18 here is concentrations of contaminants in -- in
19 the air, in particulates in -- in the air. And as
20 an example of that somewhat similar kind of
21 methodology, I'm working on a project -- it's a
22 non-litigation project in Southern California here
23 that's called Chemetco. Chemetco is a secondary
24 lead smelter. And that's one of the principal
25 issues that I'm working on right now, is trying to

1 **understand the legacy of airborne emissions, in**
2 **that case lead, that extended offsite and possibly**
3 **into commercial and residential neighborhoods.**

4 Q In the Chemetco case, did you perform
5 any type of testing?

6 A **A lot of testing has been done. I**
7 **didn't personally perform it.**

8 Q In the Chemetco case, did you take the
9 testing results that had been performed by others
10 and assess that data?

11 A **I did.**

12 Q Okay. Did you use that data to
13 determine what the -- the concentrations were in
14 the area of interest?

15 A **Yeah, a term of art we sometimes use**
16 **in -- in that arena is exposure point**
17 **concentrations, or average concentrations, or**
18 **things like that.**

19 Q How do you determine the exposure point
20 concentration and the average concentration?

21 A **Well, it all depends on the medium and**
22 **it all depends on the site. There are really --**
23 **you know, if we could start very generically,**
24 **there are really two ways to do that, regardless**
25 **of the medium. Maybe it could be airborne**

1 particulates; maybe it could be groundwater.

2 One is measuring, collecting data, and
3 just, you know, finding out. There are -- there
4 are all sorts of protocols that fall into play
5 there, and you have to make sure that you have an
6 adequate sampling plan.

7 And then the other broad category of
8 methodology is modeling.

9 Q Do you then take the data that you get
10 either from your sampling or your modeling and
11 plot that in an area?

12 A Oftentimes -- yeah, oftentimes we use
13 maps. One of the things that we do with some
14 frequency is pretty sophisticated three-
15 dimensional depictions of data, because these are
16 always three-dimensional problems.

17 Q I'm assuming when you plot that data or
18 you use your three-dimensional data plot that
19 you're talking about, then there's going to be
20 some variations of the concentrations. Is that
21 fair?

22 A I just want to clarify, we're really
23 just talking about almost like a hypothetical --

24 Q Yes.

25 A -- a generic site.

1 Q Well, we're talking about your
2 methodology generally. Is that fair?

3 **A Okay. Sure, mm-hmm.**

4 Q Okay. So when you take this, either
5 your sampling or modeling data, you essentially
6 plot that out, and there's going to be variations
7 in the amount of a particular substance of
8 interest in your area; is that correct?

9 **A That will almost always be the case.**

10 Q You then said that you take the average
11 from that; is that correct?

12 **A Sometimes. Sometimes we look at**
13 **averages. Sometimes we look at this statistical**
14 **concept that's oftentimes called the 95 percent**
15 **upper confidence limit of the mean. Sometimes we**
16 **actually look at maximums.**

17 You know, EPA has this policy that when
18 you're looking at the possibility of -- of human
19 interaction with contamination, that one thing
20 you're looking for in this kind of
21 **characterization is reasonable maximum exposure**
22 **levels, RME.**

23 Q Okay. Is the reasonable maximum
24 exposure limit, is that the same as the 95 percent
25 upper confidence limit?

1 **A You know, it really depends on the**
2 **dataset, but I would -- I would assert that most**
3 **of the time, no. Most of the time it's not the**
4 **same.**

5 **Q Okay. Going back to your non-litigation**
6 **work then, do you normally develop the plan to**
7 **determine what needs to be done at a given area or**
8 **site in order to remediate it?**

9 MR. McCLAIN: Object to the form of the
10 question. It's vague and ambiguous.

11 BY MR. ZAGER:

12 **Q You can answer.**

13 **A Yeah, I -- I'm just pausing because of**
14 **the "normally" part. We oftentimes do exactly**
15 **that. Sometimes we'll be brought in on a project**
16 **that's already well underway, and some of that**
17 **work might have already been done. We might**
18 **review the work. We might provide advice about**
19 **refining the work or -- or improving the plans.**
20 **So it -- it can vary, but that certainly is part**
21 **of my practice.**

22 **Q Okay. As any part of your practice, do**
23 **you go to active radioactive waste sites and**
24 **evaluate their practices and their compliance with**
25 **the regulations?**

1 MR. McCLAIN: Has he done that? Does he
2 do that daily? I mean, what's the -- your
3 question is unclear.

4 BY MR. ZAGER:

5 Q You can answer.

6 A That's not something I've done in my
7 practice.

8 Q Okay. You said that you helped start
9 L. Everett & Associates in approximately 2010.
10 Where were you at before that?

11 A Before that, I was with an environmental
12 engineering and consulting firm called Haley &
13 Aldrich.

14 Q How long were you with Haley & Aldrich?

15 A I was with Haley & Aldrich for about
16 eight years, although there was a gap in the
17 middle of about a year.

18 Q Okay. So you would have started there
19 approximately in what, 2000, 2001?

20 A That's about right.

21 Q Okay. Where did you go during the year
22 that you were not with Haley & Aldrich?

23 A I went to a company called Shaw
24 Environmental, which is also an environmental
25 consulting and engineering firm.

1 Q When you were at Haley & Aldrich, was
2 your practice generally the same as what it is
3 today?

4 A Yes, it was generally the same as it is
5 today. During that period of my practice, I was
6 doing less litigation support.

7 Q Okay. It was more on the characterizing
8 sites and developing or evaluating cleanup plans?

9 A Right.

10 Q All right. When you were with Shaw
11 Environmental, essentially the same duties?

12 A Same duties.

13 Q Okay. Where were you at before Shaw --
14 I'm sorry, where were you at before Haley &
15 Aldrich.

16 A Before Haley & Aldrich, it was another
17 environmental consulting firm, engineering firm,
18 called Metcalf & Eddy.

19 Q What kind of work did you do at
20 Metcalf & Eddy?

21 A Site investigations, remediation
22 evaluations, site cleanups for contaminated sites.

23 Q Same type of work as you've been doing.

24 A Correct.

25 Q All right. Have you worked anywhere

1 else since you have completed your undergraduate
2 degree where you were performing tasks other than
3 the type of work that you now do at L. Everett &
4 Associates?

5 **A No -- not for money, no.**

6 Q Okay. What did you do for not money?

7 **A Well, how about gardening.**

8 Q Okay.

9 **A No, I've been in this field ever**
10 **since -- ever since I got out of graduate school.**

11 Q Have you ever worked for any federal
12 agencies?

13 **A Well, we've worked on behalf of -- of**
14 **federal agencies. I -- I've -- in other words,**
15 **I've secured contracts with EPA. But I've never**
16 **been an employee.**

17 Q Okay. What kind of work have you done
18 on behalf of the EPA?

19 **A I was retained by EPA under a program**
20 **that they have that provides technical support to**
21 **communities that are impacted or potentially**
22 **impacted by Superfund sites, such that those**
23 **communities can have access to independent**
24 **technical advice and interpretations.**

25 Q I believe I saw that in your report.

1 You're referring to the, I believe, Exide matter?

2 **A Well, that's a little different,**
3 **actually. I mean, it's the same kind of work, but**
4 **that's with the State.**

5 Q Okay. What particular Superfund sites
6 have you worked on as a technical advisor
7 providing support to the community?

8 **A That has predominantly been work at the**
9 **Montrose and Del Amo Superfund sites.**

10 Q That's two separate ones?

11 **A They're two separate ones that,**
12 **unfortunately, are side by side.**

13 Q Okay. What are the alleged contaminants
14 in the Montrose and Del Amo Superfund sites?

15 **A They are a wide spectrum of**
16 **contaminants. There are chlorinated solvents,**
17 **such as TCE and chlorobenzene. There are kind of**
18 **specialty chemicals related to Montrose's former**
19 **production of DDT, like a compound called PCBA.**
20 **There are petroleum hydrocarbons that include**
21 **things like benzene. There are metals.**

22 Q Are any of the contaminants at issue in
23 the Montrose or the Del Amo Superfund sites
24 radioactive materials?

25 **A Those aren't -- those aren't considered**

1 **constituents of concern at those sites.**

2 Q Okay. Have you ever been a technical
3 advisor on behalf of the EPA to a community that
4 was allegedly dealing with exposure to radioactive
5 material?

6 **A No.**

7 Q Have you ever worked as a radiation
8 safety officer anywhere?

9 **A No, I haven't.**

10 Q Have you ever worked at a facility that
11 had a license for radioactive material?

12 **A No, I've never worked in a facility like**
13 **that.**

14 Q Are you familiar with the acronym GoCo?

15 **A No, I'm not.**

16 Q You also list in your CV some different
17 lectures and presentations that you've given; is
18 that correct?

19 **A Let's see -- I'm not sure --**

20 Q Publications and papers.

21 **A I'm not sure if I have lectures here.**

22 Q Okay. Well, let's look -- I guess your
23 publication and papers, is that up to date?

24 **A Yes, it is.**

25 Q Are there any of your publications or

1 papers that you believe are relevant to the issues
2 in this case?

3 **A** Well, there -- there -- some of these
4 papers do overlap, because even though they're
5 dealing with other chemicals, other compounds,
6 they address questions of contaminant fate and
7 transport.

8 **Q** Are any of your publications or papers
9 specific to radioactive waste or radionuclides?

10 **A** No, they're not.

11 **Q** Are any of your publications and papers
12 specific to radiation safety practices?

13 **A** No.

14 **Q** You said that you don't have lectures on
15 here. Have you given some lectures or some
16 presentations?

17 **A** I have, yes.

18 **Q** Okay. Have any of your lectures or
19 presentations dealt with the issues in this case
20 other than generally fate and transport?

21 **A** Well, that's my area of expertise is
22 fate and transport. I'm not sure how to answer
23 that. For example, this spring I gave a lecture
24 down in San Diego that was mostly about Exide and
25 particulate emissions and deposition, and

1 subsequent impacts onto residential soil.

2 So those are -- those are things that
3 are -- you know, that are relevant to the kind of
4 work I did in this case.

5 Q In the Exide matter, you said that
6 you're working on behalf of the State?

7 A I've been retained by the State, but --
8 and so in a sense, yes, I'm working on behalf of
9 the State, but my role is to serve as the
10 technical advisor to a community advisory group.

11 Q Okay. In the Exide matter, are any of
12 the contaminants of concern radioactive?

13 A No.

14 Q What projects have you worked on that
15 have had a contaminant of concern that was a
16 radioactive material?

17 A Let's see. Going chronologically, if we
18 go way back to my time in graduate school, I
19 actually served as a grad student representative
20 on a science board to the State of Washington that
21 was evaluating the work -- environmental work
22 being conducted at the Hanford Reservation. So
23 that wasn't paid work, but I served on that board.

24 Several years ago my company worked on a
25 site in Long Island called Hicksville, which is

1 **also a FUSRAP site. That involved radioactive**
2 **materials.**

3 **I, along with Dr. Everett, provided some**
4 **consulting at Idaho National Engineering Lab.**
5 **That was in the 1990s.**

6 **And I've worked on some radon sites**
7 **where the issue was radon levels in indoor air**
8 **that may be not protective of human health.**

9 Q Okay. So you mentioned your work on the
10 Hanford project. You mentioned Hicksville. You
11 mentioned the Idaho National Lab. And you also
12 mentioned just some various radon sites involving
13 indoor air levels.

14 I believe you also have listed here on
15 your CV a Gallagher & Kennedy matter. Is that one
16 of the one -- one of the ones you just talked
17 about, or is that in addition?

18 A Oh, yeah. That's a site out in -- thank
19 you for reminding me. That's a site out in Santa
20 Clarita. There were kind of a basket of different
21 contaminants, including radioactive materials, at
22 that site.

23 Q Did you reconfigure your CV for this
24 case in any way?

25 A I -- I did reformat my CV such that

1 **those two project examples were at the top.**

2 Q Okay. So, in other words, if I were to
3 look at your CV from another case that did not
4 involve radiation, the formal Sylvania site -- I'm
5 sorry, former Sylvania site, Gallagher & Kennedy
6 matter, and your student work at the University of
7 Washington would not be the first three that
8 appear, correct?

9 **A They might not be.**

10 Q Okay. Other than just moving the order
11 around of your matters, did you make any changes
12 to the descriptions of those matters?

13 **A With regard to an earlier CV?**

14 Q Yes.

15 **A I'm pretty sure an -- my earlier**
16 **versions of the CV didn't even have the advisory**
17 **group listed.**

18 Q Okay.

19 **A So that would have been an addition.**

20 Q Okay. Did you make any other changes
21 from previous CVs specific to this case?

22 **A I may have. I can't recall.**

23 Q Okay. In your Gallagher & Kennedy
24 matter, do you normally even mention radioactive
25 materials on other CVs?

1 **A I -- I really can't recall. I may have**
2 **added that.**

3 **Q Okay. All right. Let's go back and**
4 **let's talk about your work on the Hanford project.**
5 **You said that you were a grad student rep on a**
6 **panel or board for the University of Washington.**

7 **What really was your duties or scope of**
8 **work in that unpaid position?**

9 **A Well, that was on behalf of the State of**
10 **Washington, and there were --**

11 **MR. McCLAIN: Oh, I'm in -- I'm in the**
12 **frame? Well, that improves it, doesn't it?**

13 **BY MR. ZAGER:**

14 **Q You can answer. Go ahead.**

15 **A There were faculty and graduate students**
16 **from a variety of disciplines, and we would**
17 **address questions that -- that the State had about**
18 **the work that was being done at Hanford, technical**
19 **questions.**

20 **Q What aspect of the -- of the technical**
21 **case or the technical evaluation did you work on?**

22 **A Well, that was a long time ago, but one**
23 **aspect in particular that I recall working on was**
24 **a question of vadose zone transport. The question**
25 **really was how long would it take for various**

1 **radioactive materials that might be dissolved in**
2 **soil moisture that might be -- have been deposited**
3 **as soil or sludges, how long would it take for**
4 **that material to impact the underlying**
5 **groundwater.**

6 Q As part of the Han- -- your work on the
7 Hanford project, did you do any evaluation of
8 their safety practices while that was an active
9 site?

10 A **No.**

11 Q You mentioned your work at the
12 Hicksville FUSRAP. Just generally describe for me
13 what your duties or activities were with respect
14 to the Hicksville or formal -- former Sylvania
15 site.

16 A **Well, our -- in particular, we were**
17 **evaluating the nature and extent of contamination**
18 **with an eye toward understanding what kind of**
19 **exposure employees might have experienced after**
20 **the site had been redeveloped.**

21 Q So, in other words, after the
22 remediation effort, people that were working on
23 site, what would be their dose, if any?

24 A **I don't want to go so far as to say**
25 **dose, because, you know, being a fate and**

1 **transport guy and a geologist, I -- I don't really**
2 **do doses. But, yeah, in what way might employees**
3 **have been exposed to different kinds of**
4 **contaminants.**

5 Q Okay. The Hicksville FUSRAP project
6 that you worked on, did you do any evaluation of
7 their radiation safety practices while they were
8 working with radioactive material at that site?

9 A **No.**

10 Q Okay. What was the radioactive material
11 that they used at Hicksville?

12 A **It was uranium.**

13 Q What was Sylvania's role with respect to
14 the uranium? Were they using that doing something
15 for the government? Was it a commercial purpose?

16 A **My understand is -- my understanding is**
17 **Sylvania or a predecessor company that -- that**
18 **Sylvania ended up owning was preparing radioactive**
19 **sources for civilian reactors.**

20 Q Do you know if the material that was
21 being used at the Hicksville site was licensed by
22 any federal agency?

23 A **Yes, I believe it was licensed by the**
24 **AEC.**

25 Q Did you perform any evaluation of the

1 license for that material or their compliance with
2 the license requirements?

3 **A We certainly were -- I was aware of --**
4 **of that, but that really wasn't a focus of my**
5 **work.**

6 Q Okay. Did your work involve in any way
7 evaluating the license and compliance with the
8 license or the regulations?

9 **A No, it didn't.**

10 Q Okay. You mentioned the Idaho National
11 Engineering Lab. What -- what was your project
12 there?

13 **A That project was also a project where we**
14 **were advising the lab on monitoring techniques,**
15 **groundwater and soil moisture monitoring**
16 **methodologies.**

17 Q Was that so that the Idaho National Lab
18 could go out and then use the information you
19 provided them in their work out in the field?

20 **A That's correct.**

21 Q In other words, the Idaho National Lab
22 wasn't using on their own property radionuclides
23 or anything like that?

24 **A I really don't -- I really couldn't say**
25 **whether they were or not.**

1 Q All right. But you were helping the
2 Idaho National Engineering Lab staff develop
3 monitoring techniques.

4 **A That's correct.**

5 Q You didn't -- you weren't working with
6 any of the federal regulations related to
7 radiation safety at that point, fair?

8 **A Well, we were -- we were looking at**
9 **regulations that were related to ensuring**
10 **protection of groundwater.**

11 Q What regulations were you working with
12 in that capacity?

13 **A My recollection is those -- those really**
14 **would have been CERCLA-like regulations.**

15 Q Okay. In other words, EPA regulations.

16 **A Right.**

17 Q They were not regulations issued by the
18 Atomic Energy Commission or the Nuclear Regulatory
19 Commission, fair?

20 **A Not to my knowledge.**

21 Q Okay. Then you mentioned radon sites
22 that you've worked on. I'm assuming that's just
23 sites where there were indoor levels of radi -- or
24 radon caused by just natural radon in the soil?

25 **A Natural radon in the soil and the rocks,**

1 **yes.**

2 Q Okay. Then you also mentioned this
3 Gallagher & Kennedy matter in Santa Clarita.
4 That's California, correct?

5 **A Right.**

6 Q All right. What's your role in that
7 project?

8 **A We were -- so that was a litigation**
9 **support project, and we were actually tasked with**
10 **developing a cleanup plan. It's a big site. It's**
11 **almost a thousand-acre site, and it had been**
12 **utilized by defense contractors for many, many**
13 **years. And this particular case related to**
14 **condemnation proceedings. But one of the things**
15 **that was necessary was to try to understand how**
16 **impaired the site was to, as I understand it,**
17 **arrive at a fair value for the property.**

18 Q In the Santa Clarita matter then, were
19 you working on behalf of the property owner?

20 **A Yes.**

21 Q Okay. On behalf of the property owner,
22 then did you develop a plan for cleanup that was
23 less expensive than what the -- the government
24 entity that was trying to condemn the property
25 recommended?

1 **A In so many words, yes.**

2 Q Okay. What was the radioactive material
3 at issue in Santa Clarita?

4 **A That was principally depleted uranium.**

5 Q So it was not licensed material in any
6 way?

7 **A To my knowledge, it was not licensed**
8 **material.**

9 Q You certainly didn't evaluate any type
10 of compliance with AEC or NRC regulations in that
11 matter; is that fair?

12 **A No.**

13 Q No, it's not fair, or, no, you did
14 not --

15 **A No -- no, we did not.**

16 Q Okay. Is most of your litigation
17 work -- well, strike that.

18 How would you characterize most of your
19 litigation work? What types of cases are they?

20 **A Most of them are cases involving**
21 **contamination.**

22 Q Are they mostly CERCLA cases?

23 **A I wouldn't say they're mostly CERCLA**
24 **cases.**

25 Q Are they also nuisance cases?

1 **A Well, they're -- they're state cases**
2 **that I know wouldn't be CERCLA cases.**

3 Q Okay. So, in other words, there may be
4 a state version of CERCLA, correct?

5 **A That's correct.**

6 Q All right. So normally you're involved
7 in cases where there's some type of contamination,
8 and the dispute is over who's going to be
9 responsible for -- well, first, characterizing, is
10 there enough contamination that needs to be
11 cleaned up; and then, secondly, who's going to be
12 financially responsible for cleaning it up. Is
13 that fair?

14 **A That's certainly a big part of -- of my**
15 **litigation work. Another piece of that or -- is**
16 **cases that involve contamination where there are**
17 **allegations that people have become exposed to it**
18 **and -- and what kind of damages -- I'm not a**
19 **damages guy -- but, you know, what kind of damages**
20 **might have been caused to people or their**
21 **property.**

22 Q Okay. Looking at your testimony list
23 that's in your CV, can you tell me which of your
24 cases that you testified in relate to exposure
25 cases, meaning where people are claiming some type

1 of a health effect from exposure to a contaminant?

2 A I'm not sure if I could do that
3 personally -- I mean, perfectly.

4 Q Okay.

5 A Because so much of that kind of comes
6 after the work I do with the fate and transport
7 analysis. But I think I could take a crack at
8 that.

9 The third one down, Greenfield MHP --
10 that actually stands for mobile home park --
11 that's a case that involves, among other things,
12 allegations that folks became exposed to
13 contamination.

14 That was the question, right, exposure?

15 Q Yes.

16 A Yeah. The next one down is Wyatt,
17 et al., versus ABB. That also had a complaint
18 about people being exposed to contamination.

19 Same thing with the next one, Kirk
20 versus Schaeffler.

21 MR. McCLAIN: An oldie but goodie.

22 THE WITNESS: That's correct.

23 Moving down a little bit to the fourth
24 one from the bottom, 2011, Johnson versus Prime
25 Tanning, that's one that involved a potential of

1 people being exposed to contamination.

2 MR. McCLAIN: Tanning beds or leather?

3 THE WITNESS: Leather tanning. Let me
4 see.

5 MR. McCLAIN: You can tell I'm getting
6 bored. Let's take a break in a minute.

7 MR. ZAGER: Okay. Let's just -- let's
8 finish this, and then we can --

9 MR. McCLAIN: How much longer are we
10 going on? Are you going to go through every one
11 of them?

12 MR. ZAGER: Just -- we're on the second
13 page.

14 MR. McCLAIN: I know. I know.

15 THE WITNESS: 2010, Acevedo versus
16 California Spray Chemical Company.

17 Let's see. The DePascale versus
18 Sylvania was one that involved allegations of
19 exposure.

20 Let's see. The next one did as well,
21 that's Clark versus City of Santa Rosa.

22 There was another one, Acevedo versus
23 California Spray. There are actually two trials
24 in that one.

25 There was a component of exposure in the

1 Santa Clarita case that's listed there as 2005.

2 And I think that's it.

3 BY MR. ZAGER:

4 Q Okay. Did any of those cases that you
5 just identified as exposure cases where you've
6 given either deposition or trial testimony involve
7 exposure to radioactive material or radionuclides?

8 A Well, the Sylvania case did.

9 Q Okay.

10 A The Santa Clarita case involved some
11 radioactive materials, but the whole idea was to
12 clean that up before the site was redeveloped and
13 folks might be exposed.

14 MR. ZAGER: All right. We can take a
15 break.

16 THE VIDEOGRAPHER: Going off the record.
17 The time is 9:56 a.m.

18 (Recess.)

19 THE VIDEOGRAPHER: Going on the record.
20 The time is 10:03 a.m.

21 BY MR. ZAGER:

22 Q You mentioned you worked for the Idaho
23 National Engineering Laboratory developing
24 monitoring technology or helping them develop
25 monitoring technology. Was that for VOCs or was

1 that for radioactive materials?

2 **A That was for VOCs and radioactive**
3 **materials, actually. It was -- it was really**
4 **about monitoring soil moisture that could have**
5 **been contaminated with anything.**

6 Q Okay. Going back to your litigation
7 work, what percentage of your work is typically on
8 behalf of plaintiffs as opposed to defendants?

9 **A That's another thing I don't have**
10 **quantitatively in my mind, but we -- I'm more**
11 **often -- I'm more often working for plaintiffs'**
12 **attorneys, I believe.**

13 Q Okay. Is it -- is it also true then in
14 your exposure cases, which we just identified in
15 your testimony list, that you more often than not
16 work for plaintiffs' attorneys?

17 **A I would say that that's -- I don't work**
18 **exclusively for plaintiff attorneys in exposure**
19 **cases. You know, we take cases as they come. But**
20 **in terms of a qualitative assessment, I would say**
21 **more often plaintiffs' attorneys.**

22 Q Of the exposure cases that you
23 identified on your testimony list, is there any of
24 those that you can identify specifically where you
25 were on the defense side?

1 **A Let's look. (Peruses document.)**

2 **Well, one that I would see that would**
3 **fall under that category is Santa Clarita.**

4 Q Okay. Because you were on the property
5 owners' side of that case?

6 **A Correct.**

7 Q Okay. Have you had some other cases for
8 Mr. McClain's law firm?

9 **A Yes.**

10 Q How many cases have you had for
11 Mr. McClain's law firm?

12 **A I think just one other.**

13 Q Is that the Schaeffler case that he
14 mentioned?

15 **A Correct.**

16 Q Okay. Are you currently working with
17 Mr. McClain's law firm on another case besides
18 this one?

19 **A Well, yes, West Lake Landfill.**

20 Q Okay. Other than cases where you've
21 worked on behalf of Mr. McClain's law firm, has
22 L. Everett & Associates worked on additional cases
23 with Mr. McClain's law firm?

24 **A I can't think of any others.**

25 Q Do you know if your testimony or your

1 opinions have ever been challenged under a court
2 ruling called Daubert?

3 **A I might not know that. I -- I know**
4 **there was a dispute like that in a state case.**

5 Q Do you know if -- was your opinions --
6 strike that.

7 Were your opinions limited or excluded
8 in any way in that state case?

9 **A I don't believe so.**

10 Q Do you know what the name of that case
11 was?

12 **A Let's see. That's that 2015 case,**
13 **Hawkins.**

14 Q In your report you refer to 10 CFR -- I
15 believe it's 20.106, a federal regulation; is that
16 correct?

17 **A Correct.**

18 Q Other than this current case, the Butler
19 case, have you ever in your career analyzed
20 compliance with 10 CFR 20.106?

21 **A No, I don't believe I have.**

22 Q So this is the first time you've
23 encountered that regulation, fair?

24 **A I've encountered that regulation, but**
25 **it's the -- it's the first time I've done this**

1 **kind of work relevant to that regulation.**

2 Q Okay. In any other cases that were, you
3 know, litigation or non-litigation projects that
4 you've worked on, have you ever been called on to
5 analyze whether or not a company complied with the
6 federal radiation safety standards?

7 A **No, I haven't.**

8 Q What is your understanding of the nature
9 of this lawsuit?

10 For instance, we talked about you work
11 on CERCLA cases or the state variant of CERCLA.
12 What is your understanding of what the actual
13 cause of action is in this case?

14 A **I may not have a good understanding of**
15 **that, but -- but my -- my broad understanding is**
16 **that there are plaintiffs who allege that they**
17 **have been exposed to contamination from these**
18 **sites, SLAPS site and the HISS site, that have**
19 **migrated offsite into Coldwater Creek and -- and**
20 **into the surrounding soils.**

21 Q If I were to tell you that the cause of
22 action in this case is one that sounds under the
23 Price-Anderson Act, which is a federal law, are
24 you familiar with the Price-Anderson Act?

25 MR. McCLAIN: Object to the form of the

1 question.

2 THE WITNESS: I'm not familiar with
3 that, no.

4 BY MR. ZAGER:

5 Q Do you know what the standard of care is
6 that applies in a Price-Anderson Act case?

7 A Well, I know what the standard of care
8 is for the handling of -- of hazardous materials,
9 but not specifically Price-Anderson.

10 Q When you say you know what the standard
11 of care is for the handling of hazardous
12 materials, is that specific to radioactive
13 materials?

14 A That includes radioactive materials.

15 Q And what -- what do you believe is the
16 standard of care that would apply to the handling
17 of hazardous materials, including radioactive
18 material?

19 A Well, there are different standards of
20 care that -- that might come into play depending
21 on the type of the site. But for radioactive
22 materials, sort of the underlying concept is that
23 the general public -- exposure to the general
24 public should be kept as low as reasonably
25 achievable.

1 Q Are you aware that -- well, strike that.

2 That's also known as the ALARA principle
3 or ALARA factor?

4 A That's right.

5 Q Okay. Are you aware that under
6 Price-Anderson Act cases that the ALARA principle
7 is not the standard of care?

8 MR. McCLAIN: Object to the form of the
9 question.

10 THE WITNESS: No, I'm not aware of that.

11 BY MR. ZAGER:

12 Q Okay. Have you read any of the legal
13 opinions interpreting the Price-Anderson Act?

14 A No.

15 Q All right. Let's talk a little bit now
16 about your work on this case.

17 When were you first retained?

18 A I was retained at the very beginning of
19 March of this year.

20 Q So March of 2019?

21 A Correct.

22 Q Let me go ahead and see the file that
23 you brought.

24 MR. ZAGER: Ken, do you mind if we just
25 mark this collectively as a file?

1 MR. McCLAIN: No, go ahead. He brought
2 them for you.

3 MR. ZAGER: I appreciate that.

4 (Exhibit No. 3 was marked for
5 identification.)

6 BY MR. ZAGER:

7 Q All right. I'm going to hand you what I
8 marked as Exhibit 3. I think we talked about this
9 a little bit earlier, but just go ahead and tell
10 us what is contained in Exhibit 3, which you
11 brought here representing that it was your file.

12 A Well, just to clarify, this is materials
13 in my file that I believed you folks didn't
14 already have.

15 Q Okay.

16 A I have copies of each of my reports. I
17 have a set of invoices for this case. And we
18 already talked about this retention letter that's
19 dated March 7th. And I also have a
20 confidentiality agreement.

21 Q Okay. I believe, at least according to
22 the -- the copy that -- the unsigned copy of the
23 contract that's in Exhibit 3, were you retained by
24 Mr. Soper of Mr. McClain's firm?

25 A Correct.

1 Q What were you asked to do in this
2 particular case?

3 A In this particular case, I was asked to
4 look at the existing or available data about the
5 St. Louis airport site -- and by "data," I mean
6 environmental data -- and the Latty Avenue site,
7 also, you know, called the HISS site, and see if
8 I could determine concentrations in air and water
9 of radionuclides, and compare them to the effluent
10 limitations in the federal code, 10 CFR
11 Section 20.

12 Q Has your scope of work changed at all
13 since that initial retention back in March of
14 2019, last six months ago, seven months ago?

15 A It's changed a little bit with the --
16 with the publication of my supplemental expert
17 report, where I was also asked to evaluate a
18 couple of things, including standard of care, and
19 to at least discuss the contaminant fate and
20 transport pathway of sediments in Coldwater Creek.

21 Q Okay. So between the two reports that
22 you've written in this case, the first one being
23 March 31st, 2019, and the second one being
24 August 1st, 2019, you stated all your opinions
25 that you intend to offer in this case, at least

1 that you have up to this point in time, correct?

2 **A Up to this time. I reserve the right to**
3 **amend these opinions or offer new ones if**
4 **additional information becomes available, but this**
5 **is all I expect at this point.**

6 Q Okay. As we sit here on October 17th,
7 2019, is there any additional work that you have
8 planned?

9 **A No.**

10 Q Other than yourself has anybody else
11 worked directly with you on this matter?

12 **A I would have to take a peek at the -- at**
13 **the invoices, but I -- I do believe that my**
14 **colleague, Jorge Matos, has assisted me in**
15 **evaluating the historical data.**

16 Q What is Mr. Matos' background? Is he a
17 Ph.D. as well?

18 **A He's not a Ph.D., but he's a civil**
19 **engineer.**

20 Q Can you hand me the invoices from
21 Exhibit 3.

22 **A Yeah.**

23 Q It looks like you've issued five
24 invoices in this matter: April 7th, 2019; May --
25 I'm sorry, April -- strike that.

1 You've issued five invoices, the first
2 being March 8, 2019; the second being April 5th,
3 2019; the third being --

4 (Interruption by intercom.)

5 MR. ZAGER: Let's go off the record.

6 THE VIDEOGRAPHER: Going off the record.
7 The time is 10:17.

8 (Pause in the proceedings.)

9 THE VIDEOGRAPHER: Going on the record.
10 The time is 10:19 a.m.

11 BY MR. ZAGER:

12 Q Okay. Dr. Wells, according to the
13 invoices that you just handed me, you've issued --
14 your firm has issued five invoices for this case;
15 is that correct?

16 A **I -- I wouldn't really know, but that**
17 **sounds about right. That's right.**

18 Q Okay. It appears that the last one was
19 issued October 4th, 2019, so about two weeks ago.
20 Do you know if there's any additional invoices
21 that have been issued since that time?

22 A **No, there haven't.**

23 Q Okay. I see on your invoices you
24 charged a communication fee of \$0.04. What is
25 that?

1 **A It's actually 4 percent.**

2 Q 4 percent.

3 **A Yeah. That's -- that's a surcharge that**
4 **we add to cover the cost of shipping and**
5 **photocopying and phone calls, and, you know,**
6 **things of that sort so that we don't have to**
7 **bother ourselves or our clients with itemizing**
8 **those things.**

9 Q So at least for all of the time that was
10 billed to this matter up to October 4th, 2019, it
11 should all be contained in these invoices that I
12 have in my hand?

13 **A That's correct.**

14 Q Okay. And it appears that you kind of
15 either generally write that you are working on
16 your expert report, data analysis and document
17 review.

18 I mean, is that generally the type of
19 descriptions you use, correct?

20 **A Correct.**

21 Q All right. Mr. Matos assisted you with
22 reviewing some of the historical documents,
23 correct?

24 **A That's correct.**

25 Q Your rate, according to your expert

1 report, is 275 an hour for reviewing data and
2 preparing the report?

3 **A That's correct.**

4 Q All right. Then you charge \$500 for
5 deposition and trial testimony?

6 **A Correct.**

7 Q Okay. I'm not going to ask you to do
8 the math, but do you know approximately how many
9 hours you put into this case?

10 **A I would throw out a rough estimate of**
11 **maybe a hundred hours.**

12 Q Okay. That would be you personally?

13 **A Yes.**

14 Q Have you met with any of the plaintiffs
15 in this case?

16 **A No, I haven't.**

17 Q Do you know how many plaintiffs there
18 are in this case?

19 **A No.**

20 Q Have you reviewed any of the plaintiffs'
21 medical records?

22 **A No.**

23 Q Have you reviewed any of the plaintiffs'
24 address histories or any information about their
25 activities in and around SLAPS, Latty Avenue or

1 what they call the vicinity properties?

2 **A I -- I'm aware of some of that**
3 **information, but I -- I haven't focused on it in**
4 **any detail.**

5 Q What information have you seen about the
6 individual plaintiffs and their address histories
7 and activities in and around SLAPS and Latty
8 Avenue?

9 **A I've seen I think three of Dr. Clark's**
10 **reports, and I reviewed those briefly, and I**
11 **believe that he discusses that kind of history of**
12 **the plaintiffs' activities and, you know,**
13 **residences and locations.**

14 Q What was your purpose for reviewing
15 Dr. Clark's reports?

16 **A Really just curiosity. I mean, this --**
17 **this is one of those cases where my work doesn't**
18 **directly feed into that of Dr. Clark, at least in**
19 **a -- in a big way. And one of the things I wanted**
20 **to do, I spoke with Mr. Soper about this, is I was**
21 **interested in understanding how Dr. Clark was**
22 **looking at exposure point concentrations.**

23 Q You didn't perform any type of peer
24 review of Dr. Clark's report, did you?

25 **A No, I did not.**

1 Q With respect to his methodology for
2 determining exposure point concentrations, did you
3 evaluate how he did that work?

4 A I came to understand in a broad sense
5 how he did that work.

6 Q Do you have any criticisms of that work?

7 A No, I don't.

8 Q Okay. Is it different than what you
9 normally do?

10 A It -- it really follows along the -- the
11 sort of description I gave earlier, my
12 understanding of -- of what he's done with regard
13 to the exposure point concentration. I mean, he
14 does a lot more in the toxicology realm that's,
15 you know, not my area of expertise, so I don't
16 have any opinions about that.

17 Q For -- for evaluating the exposure
18 concentrations, do you know if he used the average
19 or the 95 percent upper limit, upper confidence
20 limit?

21 A I -- I believe that he did. I believe
22 that he used for different areas of the -- this
23 impacted area, he used soil and stream water
24 sediment data, and I believe that he used the
25 95 percent upper confidence limit as -- as kind

1 **of a taking off point for exposure point**
2 **concentrations.**

3 Q Do you believe it was appropriate for
4 him to use the 95 percent upper confidence limit
5 for evaluating potential exposures?

6 A You know, I haven't been asked to look
7 into that, and I don't specifically have an
8 opinion. But the -- the general protocol is that
9 if there's enough data to accurately estimate the
10 95 percent UCL, that it's an appropriate measure.

11 Q Okay. Do you believe there's enough
12 data here to use the 95 percent upper confidence
13 limit?

14 A I -- I really haven't made that
15 evaluation, but I think it's very likely that
16 there is.

17 Q Okay. Have you performed any of your
18 own testing in this case?

19 A No, I haven't.

20 Q You mentioned that you looked at
21 historical information and you talked about
22 technical reports that you believed was exchanged
23 in discovery in this case. Explain to me how you
24 were given access to those materials.

25 A Some of them I secured myself from

1 various government websites. And then I was given
2 access to Humphrey Farrington's online document
3 database for this case. So others I reviewed
4 and/or downloaded from there.

5 Q Let's talk first about the -- the
6 government websites that you went to. Can you
7 identify what those websites are?

8 A The Army Corps of Engineers has a
9 website for FUSRAP sites. And then this area is
10 also designated a Superfund site, and EPA has some
11 documents online as well.

12 Q Did you do any research regarding these
13 sites on the Nuclear Regulatory Commission's
14 website or any of the historical documents that
15 are available from the AEC?

16 A No, I didn't.

17 Q Okay. The documents that you had access
18 to through the Humphrey Farrington McClain
19 website, those were online, some type of online
20 document review program?

21 A Correct.

22 Q How many documents were housed on that?

23 A I -- I really have no idea.

24 Q Can you give me an estimate or an order
25 of magnitude how many documents there were?

1 **A** You know, I -- I'm just kind of an
2 informal user of that -- of that document
3 database. I would go on and search for a document
4 that -- that I knew about that I wanted to find.
5 So I really don't know how many documents are on
6 that database.

7 **Q** You said that you would search for a
8 document that you knew was out there. How would
9 you know that it was out there?

10 **A** When -- when somebody like me is getting
11 up to speed on a case, usually you start with a
12 couple documents, typically they're more recent
13 documents, and they make citations and references
14 to other documents, and it kind of snowballs from
15 there.

16 **Q** So you would look at, for instance, a
17 FUSRAP document that would talk about a historical
18 document, and then you would go to the Humphrey
19 Farrington McClain online database and you would
20 pull the document that you were looking for.

21 **A** That's correct. Or -- or the FUSRAP
22 site if -- if it was available.

23 **Q** Other than the documents that you went
24 to the Humphrey Farrington McClain database and
25 pulled down because you knew they existed, was

1 there any other documents that you looked at on
2 that database?

3 **A No. It's -- the interface is such**
4 **that -- that you have to do a search before a**
5 **document is served up to you.**

6 Q Did you do just word searches as opposed
7 to something where you were specifically going to
8 pull the document of -- of concern?

9 **A Not -- I don't recall ever doing that.**
10 **I would -- I would usually do a search for a**
11 **document title or an author or a date, or some**
12 **combination thereof.**

13 Q So you -- your search parameters were
14 typically a document title, a date or an author,
15 or some combination of those.

16 **A That's correct.**

17 Q Okay. Was there any limit placed on the
18 amount of time that you could spend looking at
19 these documents?

20 **A No.**

21 Q Other than the government websites that
22 we talked about related to the FUSRAP and EPA, and
23 the documents that you pulled down that you were
24 looking for from the Humphrey Farrington McClain
25 database, is there any other documents that you've

1 looked at in this case?

2 MR. McCLAIN: Object to the form of the
3 question. It's overly broad.

4 THE WITNESS: There's a little bit of
5 overlap in the documents for this case compared to
6 the documents for the West Lake Landfill case.
7 Not a lot, but I -- I just want to throw that out
8 there as a possible exception to the parameters
9 you just specified.

10 BY MR. ZAGER:

11 Q Okay. Can you identify specifically the
12 documents that you thought were overlap?

13 A Well, there -- there are some documents
14 that describe the transfer of leached barium
15 sulfate waste from the Latty Avenue site to the
16 West Lake Landfill that, just as I sit here, I
17 think I probably already had because of my work on
18 the West Lake Landfill.

19 Q Okay. Taking out the government
20 websites that you went to, did you go to any
21 government warehouses where documents are stored
22 such as the national -- National Archives or
23 anything like that?

24 A You mean physically go to those places,
25 no.

1 Q Did you go to any electronic database
2 for the National Archives to pull down documents?

3 **A No.**

4 Q You have a line in your report that you
5 refer to or that you've used that you relied upon
6 reference texts commonly accepted and held
7 reliable by experts in the field of environmental
8 science, hydrogeology, and contaminant fate and
9 transport, as well as generally accepted
10 principles in those fields.

11 You didn't bring any texts with you
12 today; is that correct?

13 **A That's correct, I didn't.**

14 Q What texts are you referring to in the
15 report that fall into that category, if any?

16 **A You know, as I sit here today, I'm not**
17 **sure I cited any -- any academic texts. What I'm**
18 **really referring to there is that my knowledge of**
19 **contaminant fate and transport is informed in part**
20 **by my reading of academic texts.**

21 But I think -- I think you might be
22 **right, as I -- as I sit here and think about it,**
23 **I'm not sure that I cited a specific, for example,**
24 **textbook.**

25 Q Is it fair to say if you relied on a

1 document or some material for forming your
2 opinions in this case, they would be cited in the
3 footnotes either in your March 31st, 2019, report
4 or in your August 1st, 2019, report?

5 **A Other than the reliance that comes with,**
6 **you know, background knowledge of an entire**
7 **career, that's what I intended to do was to cite**
8 **the documents that were contributing to the basis**
9 **of my opinions.**

10 Q As part of your work on this case, did
11 you look at any treatises or what you consider
12 reliable materials regarding the standard of care
13 applicable to an operator of a radiation waste
14 site back in the 1950s and 1960s?

15 **A Other than the federal code itself, no.**

16 Q Did you look at any reliable authorities
17 related to federal radiation protection standards?

18 **A No.**

19 Q Have you ever seen the actual complaint
20 that was filed in this case?

21 **A No, I don't believe I have.**

22 Q Did you review any depositions that have
23 been given in this case or in any related cases?

24 **A I'm just pausing because I want to take**
25 **a quick look at my supplemental report.**

1 MR. McCLAIN: Is it getting warm in
2 here?

3 (A discussion was held off the record.)

4 THE WITNESS: (Peruses document.)

5 No, I didn't -- didn't review any
6 depositions.

7 BY MR. ZAGER:

8 Q Okay. You told me earlier that you
9 reviewed three of Dr. Clark's reports, correct?

10 A Correct.

11 Q So it's your understanding he wrote a
12 separate report for each plaintiff in this case?

13 A That's my understanding.

14 Q Have you spoken to Dr. Clark about this
15 matter?

16 A I have spoken with Dr. Clark.

17 Q When did you talk with Dr. Clark?

18 A That would have been early on in my
19 retention, so it -- I would have spoken with
20 Dr. Clark in -- sometime in March.

21 Q What was the substance or the purpose of
22 talking with Dr. Clark?

23 A Well, really, I was trying to make sure
24 I understood the scope of my assignment. And one
25 way to do that is to speak with the other experts

1 **and find out what they're doing.**

2 Q Okay. Based on your conversation with
3 Mr. Clark, what did you understand your sign --
4 your assignment to be?

5 A Well, I think we already talked about
6 that. At first, I understood my assignment to be
7 to evaluate the available data about environmental
8 conditions at the site and the concentrations of
9 contaminants and different environmental media to
10 see if I could estimate fence line concentrations
11 in air and water, and compare those against the
12 effluent limitations that are published in
13 Section 20 of 10 CFR.

14 Q Okay. Have you only spoken to Mr. Clark
15 the one -- I'm sorry, Dr. Clark the one time?

16 A I've spoken to Dr. Clark other times but
17 on other matters.

18 Q Okay. When you spoke to Dr. Clark about
19 this case, did he appear to know what he was
20 talking about?

21 A Well, he had been involved in this case
22 long before I did. So, yeah, he definitely seemed
23 like he knew what he was talking about.

24 Q Okay. Have you spoken with Dr. Hu?

25 A No.

1 Q Do you know who Dr. Hu is?

2 A No, I don't.

3 Q Have you -- I'm sure I know the answer
4 to this then, but have you reviewed any of
5 Dr. Hu's reports?

6 A No.

7 Q Okay. So you spoke to Dr. Clark, and
8 you've looked at three of his reports.

9 Have you seen or spoken to any other
10 expert on behalf of the plaintiffs in this case?

11 A No.

12 Q Looking at your report, it appears that
13 at some point in time you had a copy of RAC or
14 RAC's report from -- for this matter; is that
15 fair?

16 A That's correct.

17 Q Did you have the complete report or just
18 sections of it?

19 A I had the complete report, although I
20 will say my copy didn't include all the
21 appendices.

22 Q Did you read through the entire report?

23 A I didn't read every word. It's a pretty
24 lengthy report, but I -- I read -- I scanned
25 through the entire report and read certain parts

1 **more carefully.**

2 Q Do you have any criticism of any of
3 what -- what you read in the RAC report?

4 A Well, that could go on a while. You
5 know, I wasn't asked to do that. I wasn't asked
6 to try to, you know, prepare a rebuttal report.

7 As you know from -- from my reports,
8 I -- I actually use some of the work in Dr. Till's
9 report, the RAC report. I don't agree with every
10 single thing that's in that report, but for my
11 purposes, I found that some of his work was
12 sufficient and -- and adequate for my purposes.

13 Q Can you identify anything specific that
14 you disagree with from Dr. Till or the RAC report?

15 A Well, once again, I -- you know, I
16 haven't been asked to come up with an exhaustive
17 list, and that -- that might take a while to leaf
18 through all those pages.

19 But one thing that comes to mind, which
20 I don't necessarily agree with, is Dr. Till's
21 assignment of grain size distribution of waste
22 that had been stored at the SLAPS side and the
23 Latty Avenue site.

24 Q What specifically do you disagree with
25 about their opinions regarding grain size

1 distribution?

2 A Well, I'll acknowledge he -- he says it
3 right in his report, and I'll -- I'll acknowledge
4 that he wasn't able to find any contemporaneous
5 physical measurements of the grain size
6 distribution of the waste. And I looked and I
7 wasn't able to find any either.

8 And so what he does, if I can paraphrase
9 I think correctly, is his team went out and found
10 some data from uranium mine tailings and expressed
11 the opinion that that was a comparable material
12 that could be used as a proxy for the grain size
13 distribution. And grain size distribution is
14 important because it's a big parameter in the
15 modeling of dust basically.

16 What he ended up with was a material
17 that was predominantly sand size grains, which is
18 pretty coarse material. And I think I might have
19 had some information that perhaps Dr. Till didn't
20 have, because through my work at West Lake
21 Landfill, I actually had a little bit of
22 information about the lithologic characteristics
23 of -- of at least that waste that ended up in the
24 landfill, and it was described as silt and silty
25 sand, which would be finer grained in general than

1 the grain size distribution that was employed by
2 Dr. Till.

3 So I agree that there's some uncertainty
4 with that set of values, but my general opinion is
5 that he might have used values that were skewed
6 toward the coarser grained and, therefore, less
7 mobile side.

8 Q Okay. With respect to your reports in
9 this particular case, the Butler matter, did any
10 of your work involve characterizing or the need to
11 characterize the grain size distribution?

12 A Well, indirectly it does. Yeah.

13 Q Explain to me how.

14 A Okay. The -- the concentration of
15 particulates in air at the fence line depends on a
16 bunch of things, but one of the things it depends
17 on is the grain size distribution of the source
18 material.

19 Q Was that a particular parameter that you
20 inputted to your calculations that are stated in
21 your report?

22 A I used the results of calculations that
23 Dr. Till employed, so I actually used his grain
24 size --

25 Q Okay.

1 **A -- distribution.**

2 Q The material -- well, strike that.

3 The information you had from the West
4 Lake Landfill that you believe characterized the
5 material more on the order of silt and sand, what
6 documents were those?

7 **A Those are the -- the site investigation**
8 **reports. There are actually a couple of them.**
9 **But they include lithologic logs that -- you know,**
10 **there's drilling that was done into the landfill,**
11 **and then there are lithologic descriptions of the**
12 **various layers that are encountered.**

13 Q Who's the author of those? Is that the
14 EPA or is that some other entity?

15 **A The author of those reports -- I mean,**
16 **they're summarized in EPA documents, but the**
17 **author of those reports were the potentially**
18 **responsible parties' consultants. I think EMS is**
19 **the principal author of those reports.**

20 Q You said that they were -- they were
21 actually doing core drillings out there and
22 pulling the material up, correct?

23 **A Correct.**

24 Q But you believed that what they
25 characterized as silty, sandy size material was

1 actually material that had -- had come from Latty
2 Avenue?

3 **A Yeah, because they -- they had described**
4 **-- they were able to differentiate a lot of the --**
5 **the layers of RIM, radiologically impacted**
6 **materials. It had different characteristics than**
7 **the waste, than the conventional municipal waste.**

8 Q The materials that were stored at SLAPS
9 had various names or number -- kind of
10 alphanumeric designations.

11 The material that was silt and sand, do
12 you know what type of material that was supposed
13 to be based on its alphanumeric designation?

14 **A From the West Lake Landfill?**

15 Q Yeah.

16 **A Well, that's the leached barium sulfate**
17 **waste.**

18 Q Okay. But you -- as you sit here, you
19 don't know the alphanumeric designation for that?

20 **A No, I don't.**

21 Q Other than this grain size distribution
22 issue we just talked about, was there anything
23 else that you recall disagreeing with when you
24 reviewed the RAC report?

25 **A Well, once again, that really wasn't my**

1 purpose. If I were asked to do that, I could -- I
2 could, you know, study it with that purpose in
3 mind.

4 But that was -- for my purposes, there's
5 a lot in that report such as dosage
6 reconstructions. That's, you know, out -- out of
7 my wheelhouse. So I can't speak to that at all.

8 But for the purposes that I had here,
9 the grain size issue was I think the -- the
10 dominant issue that I had identified.

11 Q Okay. Earlier we were talking about how
12 you would go about looking at the documents on the
13 database, and you mentioned that Mr. Matos helped
14 you out, correct?

15 A Correct.

16 Q What was the source of the documents
17 that Mr. Matos looked at? Were they just on
18 the -- the law firm's database or did he look at
19 other documents?

20 A Well, our -- our system is that we
21 maintain electronic project files on our own
22 server. So he didn't have access to the law
23 firm's database. He would have been reviewing
24 documents that I had already deposited into our
25 own server.

1 Q So you would go to the law firm's
2 database, pull down a document that you were
3 looking for, put it on some type of an internal
4 server, and then Mr. Matos may review that to help
5 you out?

6 A Correct, although I may very well have
7 downloaded that document from other places that we
8 talked about earlier, but that's generally the way
9 it went.

10 Q The documents on the internal server
11 then either could be the government documents that
12 you pulled from government websites or documents
13 you pulled from the law firm's database.

14 A Correct.

15 Q Okay. Did Mr. Matos create any type of
16 work product in this case?

17 A No.

18 MR. McCLAIN: Object to the form of the
19 question.

20 BY MR. ZAGER:

21 Q Did you go to any of the sites in this
22 particular case?

23 A I have not.

24 Q Did plaintiffs' counsel ask you to make
25 any assumptions or to assume any facts to be true,

1 any particular facts?

2 **A** **No, uh-uh, there's -- there's nothing**
3 **like that. I mean, in -- in our work we generally**
4 **assume that the technical data that we have**
5 **available to us is accurate. But there were no**
6 **special instructions from counsel.**

7 **Q** Okay. We've already talked about how
8 you spoke with Mr. -- or, I'm sorry, Dr. Clark on
9 one occasion specifically related to this matter.

10 Did you contact anybody else, anybody in
11 any government agencies, any colleagues that you
12 rely on, anything like that?

13 **A** **Other than Mr. Matos, that's it.**

14 **Q** Do you know who Dr. John Frazier is?

15 **A** **No, I don't.**

16 **Q** You didn't review any reports or
17 deposition testimony of Dr. Frazier?

18 **A** **I don't think so.**

19 **Q** Other than just reviewing your reports,
20 did you do anything else to get ready for the
21 deposition today?

22 **A** **I did review some of the documents that**
23 **I cited in the reports.**

24 **Q** Which documents did you review that you
25 cited in your reports in preparation for the depo

1 today?

2 **A** The documents that I've reviewed -- what
3 you're really asking is just in the last couple of
4 days?

5 **Q** Yeah --

6 **A** I did review parts of the RAC report.
7 That's Dr. Till's report. And I reviewed the set
8 of EPA memos that aren't specifically about
9 this -- this case, but they're from 1997 to about
10 2000 that talk about determining cleanup standards
11 for CERCLA sites that contain radioactive
12 contamination.

13 **Q** Why did you look at those documents?

14 **A** I looked at those documents to -- to
15 just make sure I was fresh on kind of the
16 evolution of cleanup standards.

17 **Q** Are you familiar with the ICRP? Do you
18 know what that is?

19 **A** Yes, I am.

20 **Q** What's the ICRP?

21 **A** I'm sorry, I -- I can't think of the
22 acronym.

23 **Q** Okay. Do you -- can you generally
24 explain to me what you think their role is or what
25 type of organization it is.

1 **A It's an international organization about**
2 **radiation safety.**

3 Q As part of your work on this case, did
4 you look at any ICRP reports or documents?

5 **A No.**

6 Q Okay. And it's the International
7 Commission on Radiation Protection.

8 There's also a group called the NCRP,
9 the National Commission on Radiation Protection.
10 Did you look at any of their materials?

11 **A No, I didn't.**

12 MR. ZAGER: We'll take another quick
13 restroom break. This is a decent transition
14 point.

15 THE VIDEOGRAPHER: Going off the record.
16 The time is 10:52 a.m.

17 (Recess.)

18 THE VIDEOGRAPHER: Going on the record.
19 The time is 11:00.

20 BY MR. ZAGER:

21 Q All right, Dr. Wells, you've looked at a
22 lot of materials, both discovery materials as well
23 as documents, that you identified on government
24 websites, correct?

25 **A I -- I'm just pausing because I'm not**

1 **sure I understand what the distinction is. I'm**
2 **not sure what discovery materials exactly means.**

3 Q Fair. Sure.

4 Earlier when we were talking about
5 documents that you reviewed, you called them
6 technical documents or historical documents, and I
7 asked you if those were documents that you
8 understood had been exchanged between the parties
9 in discovery in this case, correct?

10 **A I see, yes.**

11 Q Okay. Essentially they would be the
12 documents that you had access to from the -- the
13 law firm's database.

14 **A I understand.**

15 Q Okay. And this is really just kind of a
16 general background question.

17 You looked at thousands of pages of
18 documents from the government websites. Is that
19 fair?

20 **A That's probably fair, yes.**

21 Q You looked at numerous pages of
22 documents that you pulled down, specific documents
23 you were looking for from the law firm's website,
24 correct?

25 **A Correct.**

1 Q All right. So you have a general
2 understanding of, you know, the locations that
3 we're going to be talking about and other issues
4 in the case. Is that fair?

5 **A That's correct.**

6 Q Certainly to get up to speed in this
7 case, you had to look at background materials.

8 **A Right.**

9 Q Would you agree with me that the
10 radioactive material that was both processed by
11 Mallinckrodt at its downtown site as well as the
12 material that was ultimately stored at SLAPS
13 before being sold and transported elsewhere was
14 all owned by the United States government?

15 **A I don't have an opinion about ownership.**

16 Q And just to be clear, I'm not asking for
17 an opinion. This is really just to get an
18 understanding of the factual background.

19 Do you know who owned that material?

20 **A No, I don't know who owned the material.**

21 Q Have you seen any document in all of
22 those documents that you've seen that suggested
23 that Mallinckrodt owned that material, whether it
24 was the material that they used to process at the
25 downtown site or the material that they -- or

1 strike that. Strike that.

2 Have you seen any documents showing that
3 Mallinckrodt owned the material that was either
4 processed at the St. Louis downtown site or that
5 was ultimately warehoused at the SLAPS site?

6 **A I am aware that -- that the ownership**
7 **question might be complicated. For example, I**
8 **recall reading that -- that for at least some of**
9 **these materials, the uranium remained the property**
10 **of the -- the U.S. government. I -- I really just**
11 **don't know about the ownership of the material as**
12 **a whole.**

13 Q That's a fair point. My question is a
14 little bit different, though.

15 With respect to Mallinckrodt
16 specifically, have you seen any document that
17 suggests that Mallinckrodt owned the material that
18 was either processed at the St. Louis downtown
19 site or that was warehoused at SLAPS?

20 **A I haven't seen any documents like that.**

21 Q Okay. When I use the term "SLAPS," do
22 you understand what that is?

23 **A Yes, I do.**

24 Q And what is SLAPS?

25 **A That's the St. Louis Airport Site.**

1 Q Okay. You would agree with me that
2 Mallinckrodt never owned the St. Louis Airport
3 Site or SLAPS.

4 A I -- I understand that Mallinckrodt
5 operated the site for a while, but I -- I don't
6 believe they ever owned it.

7 Q Okay. What is your understanding about
8 the relationship between Mallinckrodt and the
9 United States government with respect to this
10 material and the site that we're going to be
11 talking about, SLAPS?

12 A Can you clarify that? Because that --
13 that seems like kind of a broad question. I'm not
14 sure I understand it.

15 Q Sure. You understand that Mallinckrodt
16 is not a federal agency, correct?

17 A Correct.

18 Q In other words, it's not a branch of the
19 Atomic Energy Commission -- or it wasn't a branch
20 of the Atomic Energy Commission.

21 A No, my understanding is it's a private
22 company.

23 Q Okay. Do you have an understanding as
24 to what the relationship was between Mallinckrodt
25 Chemical Works, the private company, and the

1 United States government for this material, and
2 SLAPS specifically?

3 **A I'm not an expert on -- on the ownership**
4 **or -- or relationship there, but my understanding**
5 **is that Mallinckrodt was working on behalf of the**
6 **U.S. government.**

7 Q Okay. I'll represent to you that
8 Mallinckrodt was a government contractor. Have
9 you looked at any of the contracts between
10 Mallinckrodt and the United States government
11 relative to either the material or SLAPS?

12 **A No, I haven't.**

13 Q Do you know when the U.S. government
14 first obtained the right to use SLAPS or -- or
15 operate SLAPS?

16 **A I -- it was approximately in 1948, I**
17 **think.**

18 Q Okay. If I told you it was actually
19 1946 --

20 **A Oh.**

21 Q -- would you have any reason to disagree
22 with that?

23 **A I have no reason to disagree.**

24 Q Okay. Were you aware that in 1947 the
25 U.S. government actually obtained title, meaning

1 ownership, of the SLAPS property?

2 **A I wouldn't have known the exact date,**
3 **but I understand that they did obtain title.**

4 Q Okay. Do you know if at any point in
5 time the United States government sold the
6 property or divested its interest in the property?

7 And by "property," I'm talking about
8 SLAPS.

9 **A I know that there was -- there was talk**
10 **about returning the property to the city, but I**
11 **don't understand that that ever happened. So I --**
12 **I don't really have any information about -- about**
13 **whether they transferred the property.**

14 Q Okay. Do you know what ultimately
15 happened with respect to the government's
16 ownership interest in the material that was stored
17 at SLAPS? In other words, do they -- do they
18 still have it? Did they sell it? What happened
19 to that material?

20 **A Well, I know what happened to the**
21 **material, but I -- I don't have knowledge about**
22 **the specific ownership status.**

23 **(Exhibit No. 4 was marked for**
24 **identification.)**

25 BY MR. ZAGER:

1 Q I'm going to hand you what I marked as
2 Exhibit 4.

3 Go ahead and take a look at that, and
4 tell me if you recognize that document.

5 **A (Peruses document.)**

6 **I don't believe I've reviewed this**
7 **document before.**

8 Q Okay. Let's go ahead and take a look at
9 the third page of Exhibit 4. This is a letter
10 from Mr. Belcher at the U.S. Atomic Energy
11 Commission; is that correct?

12 **A It appears to be, yes.**

13 Q And he's writing it to somebody at
14 Continental Mining and Milling Company?

15 **A Right.**

16 Q Okay. And if we go down in the body of
17 it, he's talking about the sale -- I'm sorry --
18 basically a contract modification to a sale of the
19 property.

20 Is that your understanding?

21 **A Well, so this is a fairly lengthy**
22 **document, and I haven't --**

23 Q I understand.

24 **A -- seen this before.**

25 **I don't think this is about a sale of**

1 **the property. I think this is a sale of the**
2 **material.**

3 Q Thank you. You're actually right. If I
4 said "property," I misspoke. I meant material.

5 Let's go to -- and it's actually a
6 little bit in reverse order. Let's go to the next
7 page entitled "Supplement to Bill of Sale."

8 Do you see that document?

9 **A I do.**

10 Q Okay. And you would agree with me just
11 by looking at the "whereas" clause at the top that
12 this is a supplement to a bill of sale between the
13 United States of America, acting through the
14 United States Atomic Energy Commission, and
15 conveying property to Continental Mining and
16 Milling Company.

17 **A I'm not an expert on contracts, but**
18 **that's what the words say.**

19 Q Okay. If you go down to the -- the
20 third paragraph where it says, "Now, therefore."
21 Do you see that?

22 **A Yes, I do.**

23 Q Okay. Starting after the -- the amount
24 of money, it says: "The government hereby
25 bargains, sells and conveys to the purchaser

1 approximately 3500 tons of C-liner slag stored on
2 the east end of a government-owned site located at
3 50 Round Road, Robinson, Missouri, as shown," and
4 it references a document.

5 Did I read that correctly?

6 **A Yes.**

7 Q Okay. That's consistent with your
8 understanding that SLAPS was owned by the -- the
9 federal government, correct?

10 **A That the property was owned by the**
11 **federal government. Yes.**

12 Q All right. And according to this, the
13 C-liner slag that's being sold, is that some of
14 the material that is at issue in this case?

15 **A Yes.**

16 Q There's no mention of Mallinckrodt in --
17 regarding the sale between the U.S. government and
18 Continental Mining and Milling that you see, is
19 there?

20 **A Well, once again, this is a lengthy**
21 **document that I haven't read, but on -- on the**
22 **page we're looking at, I don't see any mention.**

23 Q Okay. Let's go -- they don't have page
24 numbers -- it's about halfway in, it says "Bill of
25 Sale" at the top. Do you see that?

1 **A I'm not there yet.**

2 Q Okay.

3 **A Just give me a second.**

4 Q I'll hold it up so you can see it.

5 **A Okay. Yes, I'm with you.**

6 Q This --

7 MR. McCLAIN: All he's doing now is
8 reading documents that you're handing him for the
9 first time. I object to this procedure. It's not
10 part of his report or it's not --

11 MR. ZAGER: Okay.

12 MR. McCLAIN: -- part of the opinion
13 that he's offering in this case.

14 MR. ZAGER: Okay.

15 MR. McCLAIN: You can make this in your
16 motion, whatever it's going to be, based on these
17 documents without his input because he doesn't
18 really have any.

19 MR. ZAGER: Understood.

20 BY MR. ZAGER:

21 Q Under the bill -- this particular bill
22 of sale is again between the United States of
23 America, by and through the United States Atomic
24 Energy Commission, and the purchaser then is
25 Continental Mining and Milling; is that correct?

1 **A** Well, once again, I'm -- you know, I'm a
2 geologist. I'm not an expert on contracts. But
3 that's what the words say.

4 **Q** Okay. Then down below we see a
5 description of material and the approximate
6 quantities. Do you see that?

7 **A** I do.

8 **Q** Okay. Again, you've looked at documents
9 referencing what materials were at SLAPS, correct?

10 **A** Correct.

11 **Q** Does this appear to be the type of
12 material that was at SLAPS, and the quantity
13 specifically?

14 MR. McCLAIN: Object to -- well, how
15 would he know that? I mean, what -- what is it
16 that you want him to do, that you're asking his
17 expertise to read this document to you that's in
18 English?

19 MR. ZAGER: Okay.

20 MR. McCLAIN: I don't understand this
21 process, and it's wasting what I thought was --
22 you wanted to know his opinions, and all you're
23 doing is having him read documents that are not
24 part of his opinion.

25 MR. ZAGER: Well --

1 MR. McCLAIN: And it's not --

2 MR. ZAGER: Counsel, you can object to
3 the form, but I --

4 MR. McCLAIN: I do.

5 MR. ZAGER: I will ask my questions, and
6 we will see where it goes.

7 BY MR. ZAGER:

8 Q Go ahead, you can answer.

9 **A I'm sorry, can you repeat the question**
10 **again?**

11 Q Sure. I'm just saying looking at that
12 description of the property, does that appear to
13 be the same radioactive material that was stored
14 at SLAPS and then ultimately transferred away from
15 SLAPS?

16 **A I'll say not quite, because I know that**
17 **there were material that was stored at SLAPS that**
18 **was transported to other places. But this appears**
19 **to be the list of materials that were transported**
20 **to the Latty Avenue site.**

21 Q Okay. So, in other words, if we look at
22 that 1966 time frame and the materials that would
23 have been at SLAPS, this is consistent with the
24 type of material that was moved from SLAPS to
25 Latty Avenue, correct?

1 **A** **That's my understanding of the nature of**
2 **the material that was moved from the one site to**
3 **the other.**

4 Q Okay. Where we started was I asked you
5 if you knew of -- or if you had seen any documents
6 that suggested that Mallinckrodt owned the
7 material that was stored at SLAPS.

8 Do you recall that question?

9 **A** **Yes.**

10 MR. McCLAIN: Object to the form of the
11 question.

12 BY MR. ZAGER:

13 Q Okay. Based on what we just looked at,
14 and I understand it's -- it's a multipage document
15 you're seeing it for the first time -- this would
16 at least be consistent with the U.S. government
17 owning the property because it's actually the one
18 that sold it, fair?

19 MR. McCLAIN: Object to the form of the
20 question. I don't know that --

21 BY MR. ZAGER:

22 Q You can go ahead.

23 MR. McCLAIN: I don't think it's
24 appropriate for you to be offering an opinion on
25 something you've just seen. If you feel

1 comfortable offering an opinion about it, go
2 ahead, but I -- I don't know what this procedure
3 is that we're employing here.

4 MR. ZAGER: Counsel, object to the form.
5 Your witness can answer. He's an expert.

6 MR. McCLAIN: I haven't objected to the
7 form, but I -- no, he's not an expert on contracts
8 and who owns what. That's not what he's employed
9 for.

10 BY MR. ZAGER:

11 Q Go ahead, you can answer the question.

12 A Well, first of all, I'll, I think,
13 correct you again, because you asked me about the
14 property, and -- and this isn't about land.

15 Q Right.

16 A But, you know, I've -- kind of a broken
17 record, but I'm not an expert on contracts. I
18 don't have an opinion about ownership of -- of
19 material, per se. So I -- I really can't make an
20 opinion about the meaning of this document.

21 Q Okay. So it's your testimony you're --
22 you're not an expert on contracts, fair?

23 A Fair.

24 Q You're not offering any opinions
25 regarding ownership of the material, fair?

1 **A Correct.**

2 Q Okay. Let's go ahead and take a look at
3 Exhibit 2, which is your report. And specifically
4 on page 21, you have a footnote 45.

5 Do you see that?

6 **A I do see that.**

7 Q Okay. You write in your footnote 45:
8 "I understand that Mallinckrodt did not officially
9 operate SLAPS until 1953, but it was always
10 Mallinckrodt's waste being stored at the site,
11 being transported directly from Mallinckrodt's
12 downtown facility."

13 Did I read that correctly?

14 **A You did.**

15 Q Okay. You would agree with me that you
16 don't have any basis to say that Mallinckrodt
17 owned this material, so it wasn't their waste,
18 fair?

19 MR. McCLAIN: Object to the form of the
20 question.

21 THE WITNESS: What I mean by this
22 statement is that the -- that the waste is -- was
23 originated from Mallinckrodt's operation downtown.
24 That's what I mean by that statement.

25 BY MR. ZAGER:

1 Q Can you identify for me any federal law
2 that would make Mallinckrodt responsible for
3 government-owned waste that was being stored at a
4 government-owned and operated facility, even when
5 it was not under contract, meaning Mallinckrodt
6 was not under contract, to operate the SLAPS site?

7 MR. McCLAIN: Objection. There's four
8 legal questions involved in answering that
9 question. He is not a legal expert, and so he's
10 not offering an opinion --

11 MR. ZAGER: He's offering legal
12 opinions.

13 MR. McCLAIN: It's not a legal opinion.
14 It's a -- it's -- he's told you what that
15 statement is based -- based upon. It's not a
16 legal conclusion that he's reached, but, rather, a
17 common sense conclusion. You and I will fight
18 about what the legalities are.

19 MR. ZAGER: Right.

20 MR. McCLAIN: Okay. He's not -- he's
21 not going to be offering any opinions to support
22 that -- that point of view.

23 MR. ZAGER: Okay. Nevertheless, I'm
24 going to ask my question and establish my record.
25 Please contain it to objection of form so we can

1 all get done with this.

2 BY MR. ZAGER:

3 Q Can you identify any federal law that
4 would make Mallinckrodt responsible for
5 government-owned waste at a government-owned site
6 that Mallinckrodt was not under contract to
7 manage?

8 A It's not my intention to offer a legal
9 opinion. I'm -- I'm a geologist, not a lawyer.

10 It is my understanding that not only
11 owners but also operators of facilities can have
12 responsibility for environmental issues. So
13 the -- I do have some knowledge through my
14 professional experience that not only owners can
15 be held responsible for environmental liabilities.

16 Q Can you identify for me, though, a
17 federal law that would specifically -- that would
18 make Mallinckrodt responsible for this material
19 prior to 1953?

20 A No, I can't.

21 Q Can you identify for me any federal
22 regulation or federal radiation safety standard
23 that would make Mallinckrodt responsible for the
24 waste material owned by the government at a
25 government-operated site?

1 **A No, I don't have an opinion about that.**

2 Q Okay. You mentioned -- with respect to
3 your statement that you are aware that there's
4 laws that would require people other than the
5 owner to be responsible for the waste, does that
6 arise under CERCLA? Is that what you're talking
7 about?

8 **A That's what I was thinking of, yes.**

9 Q You mentioned that in footnote 45: "I
10 understand that Mallinckrodt did not officially
11 operate SLAPS until 1953."

12 Do you know how it was that Mallinckrodt
13 came to operate at the SLAPS site in 1953?

14 **A I'm not sure what that question means,**
15 **"how it was."**

16 Q Okay. I'll represent to you that
17 Mallinckrodt contracted with the federal
18 government as of July 20th, 1953, to operate at
19 SLAPS.

20 I believe you told me you haven't seen
21 that contract or any other contract, fair?

22 **A Fair.**

23 Q Are you aware of any contract that
24 existed prior to July 20th of 1953 that required
25 Mallinckrodt to operate or manage any aspect of

1 SLAPS?

2 **A Prior to 1953. No, I'm not aware of**
3 **anything like that.**

4 Q Would you agree with me that in 19 --
5 strike that.

6 Would you agree with me that prior to
7 1954, that the federal government had a monopoly
8 on all nuclear energy and nuclear materials?

9 MR. McCLAIN: Object to the form of the
10 question. Calls for a legal opinion.

11 BY MR. ZAGER:

12 Q You can answer.

13 **A In my mind, that also calls for sort of**
14 **an economic opinion, and I -- I'm not an economic**
15 **expert. So I really -- my answer to that is I**
16 **don't know.**

17 Q Okay. With respect to the operation of
18 SLAPS by Mallinckrodt starting on July 20th or on
19 or about July 20th, 1953, have you performed any
20 analysis as to what Mallinckrodt's duties or
21 responsibilities were?

22 **A My understanding is that their -- their**
23 **duties were to manage that waste repository.**

24 Q Have you analyzed what their duties were
25 with respect to management of the -- the site? In

1 other words, specifically what they were supposed
2 to do, not supposed to do, or anything like that.

3 **A In terms of reviewing any contracts that**
4 **might exist with the government, no.**

5 Q Or what about any other authoritative
6 documents, regulations, standards, anything like
7 that?

8 **A I haven't reviewed any documents**
9 **specifically about Mallinckrodt's operations**
10 **there, no, and their duties.**

11 Q Okay. Are you aware or have you
12 analyzed whether the Atomic Energy Commission
13 requested Mallinckrodt perform any specific types
14 of maintenance at SLAPS while it was responsible
15 for its operation?

16 **A You know, I don't have any details as to**
17 **what kind of maintenance requests might have been**
18 **made, but it's my understanding that that would**
19 **have been under their purview to provide**
20 **maintenance to -- to, you know, keep up the**
21 **facility, to prevent materials from migrating**
22 **offsite, to maintain the fence line, things like**
23 **that.**

24 Q Okay. Where does that understanding
25 come from?

1 **A** It comes from my -- my reading of the
2 historical documentation about the SLAPS site as
3 is summarized in different reports, like Army
4 Corps of Engineers, you know, reports that have
5 historical summaries of the site.

6 **Q** Okay. I'll represent to you that their
7 obligation was to perform maintenance work at the
8 site as the Commission requested.

9 Is it fair to say you don't have any
10 specific information about what the AEC requested
11 be done?

12 MR. McCLAIN: Object to -- object to the
13 preface, and let him answer the second half of
14 that question.

15 BY MR. ZAGER:

16 **Q** You can answer.

17 **A** I don't have -- I don't have any
18 information about specific requests that would
19 have -- would have passed between the government
20 and Mallinckrodt.

21 **Q** Okay. Did the Atomic Energy Commission
22 provide Mallinckrodt with any equipment for them
23 to use for maintaining the property that you're
24 aware of?

25 **A** I don't know.

1 Q Okay. Do you know at what point the
2 material housed at SLAPS became licensed?

3 A I don't specifically know that, no.

4 Q Okay. I believe that you stated in your
5 report that -- strike that.

6 You state that Mallinckrodt -- on
7 page 12 of your report, you state: "Mallinckrodt
8 managed the SLAPS site from 1953 to 1966." Is
9 that correct?

10 A That's what it says, yes.

11 Q Okay.

12 MR. McGAHREN: I'm sorry, what page was
13 that?

14 MR. ZAGER: Page 12.

15 BY MR. ZAGER:

16 Q Do you know if there was a license
17 issued for the material housed at SLAPS at any
18 point in time prior to 1966?

19 A Well, I know it was licensed upon
20 transport to the Latty Avenue site, but, no, I --
21 I don't know about before.

22 Q Okay.

23 (Exhibit No. 5 was marked for
24 identification.)

25 BY MR. ZAGER:

1 Q I'm going to hand you what I marked as
2 Exhibit 5. Go ahead and take a minute, look at
3 that and tell me if you recognize that document.

4 MR. MCGAHREN: This is 5?

5 MR. ZAGER: Five.

6 THE WITNESS: (Peruses document.)

7 Okay. I have reviewed this document.

8 BY MR. ZAGER:

9 Q Just to be fair, what you're saying is
10 you reviewed what I've handed you, correct?

11 **A I've reviewed what you handed me. I**
12 **haven't seen this document before.**

13 Q You've never seen this document before?

14 **A No.**

15 Q Did you look at any of the licenses for
16 the radioactive material that's at issue in this
17 case?

18 **A No, I didn't.**

19 Q Okay. Well, if you look at the last
20 page of Exhibit 5, there's a date down there, and
21 it's -- it's not very legible, but it looks like
22 December something of 1963. Do you see that?

23 **A I -- I can't really read it, but I see**
24 **what you're talking about.**

25 Q Okay. Assuming that this license,

1 Exhibit 5, was -- was issued in that December 1963
2 time frame to Contemporary Metals Corporation, do
3 you have any understanding as to what or how that
4 would have affected responsibility for complying
5 with radiation safety standards for the material
6 housed at SLAPS?

7 MR. McCLAIN: Object to the form of the
8 question. It's a legal conclusion.

9 THE WITNESS: No, I -- I really don't
10 have an understanding of -- of how this license
11 would have -- would affect their obligations.

12 BY MR. ZAGER:

13 Q Okay. Is it your understanding that
14 after a license is issued to a licensee for
15 radioactive materials, that they're required to
16 comply with the 10 CFR Part 20 federal
17 regulations?

18 A Yes.

19 Q Okay. With respect to your statement on
20 page 12 of your report about Mallinckrodt being --
21 or Mallinckrodt managing the SLAPS site from 1953
22 to early 1966, is it possible that that actually
23 terminated in 1963 with the license that was
24 issued to Continental Metals Corporation?

25 MR. McCLAIN: Object to the form of the

1 question. Calls for a legal conclusion.

2 THE WITNESS: That's not my
3 understanding of -- of what happened. My
4 understanding is Continental Metals didn't take
5 possession or transfer that waste until 1966.

6 (Exhibit No. 6 was marked for
7 identification.)

8 BY MR. ZAGER:

9 Q Okay. Next I will hand you what I've
10 marked as Exhibit 6. Go ahead and take a look at
11 that.

12 A (Peruses document.) Okay.

13 Q Have you ever seen Exhibit 6 prior to
14 today?

15 A No, I haven't.

16 MR. McCLAIN: Object to the form of the
17 question. He doesn't add anything to these
18 documents. You can use them however you can use
19 them without his input. Why are we wasting time
20 having him on documents that he's not going to
21 testify about, that -- that in areas that he's not
22 an expert in. I don't understand why you're doing
23 this, and it's abusive at this point.

24 MR. ZAGER: Counsel, just object to the
25 form. I understand it's not what you would do,

1 but I am entitled to take my deposition.

2 MR. McCLAIN: It's not -- it's not only
3 what I would do, but it's abusive in that -- in
4 that you're just having him read documents that he
5 doesn't know anything about on legal issues, which
6 you're entitled to raise, I'm not questioning
7 that, but not through him.

8 MR. ZAGER: Okay. That's -- and your
9 objection is noted for the record.

10 BY MR. ZAGER:

11 Q And just to be clear, do you feel I'm
12 abusing you? I mean I have not raised my voice.

13 MR. McCLAIN: I'm not talking about you.
14 You're being very polite, and I'm not suggesting
15 you're not. But it's an abuse of the way to go
16 about it. Maybe you don't have anything that you
17 really want to ask him.

18 MR. ZAGER: I do.

19 MR. McCLAIN: But, you know, he doesn't
20 know anything about this.

21 BY MR. ZAGER:

22 Q Okay. Have you had a chance to look at
23 Exhibit 6?

24 A I have.

25 Q Okay. This is a source material license

1 issued February 14th, 1966, correct?

2 MR. McCLAIN: No, you don't know
3 anything about it, do you?

4 THE WITNESS: I mean I can read the date
5 on it. I don't -- I --

6 BY MR. ZAGER:

7 Q Okay. Well, let me -- let me back up,
8 because it's an incorrect statement that you
9 haven't offered any opinions.

10 You've stated that Mallinckrodt managed
11 the SLAPS site from 1953 to 1966, correct?

12 A That's correct.

13 Q What is your understanding for what
14 happened in early 1966 that terminated
15 Mallinckrodt's operation of SLAPS?

16 A My understanding is that the remaining
17 waste materials that were still being stored at
18 SLAPS began to be transferred and ultimately were
19 entirely transferred with, of course, the
20 exception of residuals in the soil to Latty
21 Avenue.

22 Q Okay. Is it your understanding that
23 another reason why Mallinckrodt's involvement at
24 SLAPS stopped in early 1966 is that the material
25 became licensed to another company? Hence,

1 Exhibit 6.

2 **A** I can answer the last part of that
3 question. It's my understanding that the material
4 did become licensed to another company. I don't
5 have any particular knowledge nor opinion about
6 all the reasons Mallinckrodt might have ceased
7 operating SLAPS.

8 **Q** Okay. So we've talked about the
9 statement of your opinion that Mallinckrodt
10 stopped -- Mallinckrodt stopped operating the site
11 in early 1966. Your understanding that this
12 material was sold and then eventually moved to
13 Latty Avenue, correct?

14 **A** Correct.

15 **Q** Do you have an understanding as to what
16 then happened with the SLAPS site after
17 Mallinckrodt was no longer working there or
18 operating it in early 1966?

19 **A** Well --

20 MR. McCLAIN: Object to the form of the
21 question. It's overly broad and vague.

22 BY MR. ZAGER:

23 **Q** You can answer.

24 **A** I'll -- I'll answer the part that --
25 that I can answer.

1 It's my understanding that starting soon
2 thereafter, various agencies of the federal
3 government began testing environmental testing of
4 the site itself, of drainage ditches, of offsite
5 soil, and things like that.

6 Q You're familiar with the term
7 "decommissioning"?

8 A Yes.

9 Q Was there ever actually a
10 decommissioning of the SLAPS site that you're
11 aware of?

12 A I -- I don't know.

13 Q Okay. You certainly haven't seen any
14 contract or statement that Mallinckrodt was
15 responsible for remediating the site,
16 decommissioning the site or taking any action
17 after it was done in early 1966, fair?

18 MR. McCLAIN: Object to the form of the
19 question, unless he's looked.

20 THE WITNESS: I -- in the course of my
21 review of the documents, I haven't seen any
22 indications of that one way or the other.

23 BY MR. ZAGER:

24 Q Okay. You note in your report that the
25 case management order -- and this is your first

1 report from March 31st, 2019 -- that the case
2 management order required you to determine whether
3 there were releases of radiation in excess of the
4 effluent limitations found in applicable federal
5 regulations, 10 CFR Section 20.106(a), Appendix B.

6 Is that your understanding of what you
7 were at least initially tasked with doing?

8 **A That's a big part of what I was tasked**
9 **to do. I was also asked to just get up to speed**
10 **on the environmental condition and environmental**
11 **history of the site.**

12 Q Okay. Explain to me what 10 CFR
13 20.106(a) is.

14 **A It's the -- it's the portion of the**
15 **federal code that talks about protection of the --**
16 **of people against radiation exposure.**

17 Q Would you agree with me that it's a
18 quantitative standard?

19 MR. McCLAIN: Object to the form of the
20 question.

21 THE WITNESS: I would agree with you
22 that it's, in part, a quantitative standard. I
23 would also, you know, note that the standard, you
24 know, evolves over time. So I would -- I would
25 say that it's partially a quantitative standard

1 and it's partially a qualitative standard.

2 BY MR. ZAGER:

3 Q It's my understanding from your report
4 that the version of 10 CFR 20.106(a) that you
5 applied in this case was the 1960 edition; is that
6 correct?

7 A Correct.

8 Q Did you look at any other editions other
9 than 1960?

10 A I did.

11 Q What other editions did you look at?

12 A I looked at the current edition, and I
13 looked at an edition from the early 1990s.

14 Q Okay. You stated that it's partly
15 quantitative and partly qualitative. What part of
16 it is qualitative?

17 A The part that's qualitative is the --
18 the part of that code that describes in text what
19 the objective is. We already talked a little bit
20 about as low as reasonably, you know, achievable.
21 So the objective of Section 20 is that licensed
22 operations will maintain their facilities in a way
23 that exposure to the public is kept as low as --
24 as practical. They then go on to try to quantify
25 what that means in things that are measurable.

1 But I think it's important to understand
2 the -- the -- sort of the basis or the rationale
3 or the goal that the federal government describes
4 in words.

5 Q Could a licensee be cited if they
6 complied with the quantitative requirements of
7 10 CFR Part 20.106, but arguably didn't comply
8 with the ALARA portion of it?

9 MR. McCLAIN: I'm sorry, can I hear the
10 question back?

11 MR. ZAGER: I can just re- -- I'll state
12 it again.

13 BY MR. ZAGER:

14 Q Could a licensee be cited for complying
15 with the quantitative portion of 20.106 if they
16 arguably did not comply with the as low as
17 reasonably -- whatever it -- what is ALARA?

18 A As low as reasonably achievable.

19 Q Okay. Thank you.

20 MR. McCLAIN: Objection. Calls for a
21 legal conclusion.

22 BY MR. ZAGER:

23 Q Could a licensee be cited for complying
24 with the quantitative portion of 20.106(a) if they
25 arguably did not comply with the

1 as-low-as-reasonably-achievable principle?

2 **A** I don't have an opinion about whether or
3 not a licensee could be cited, because I think
4 that is a legal call, but I think it's possible
5 that activities could not meet that standard even
6 though they are meeting the quantitative standards
7 that are designated in Appendix B, Table 2.

8 **Q** Are you aware of any instance when the
9 Atomic Energy Commission or the Nuclear Regulatory
10 Commission cited a licensee that was in compliance
11 with the quantitative standards, but they
12 allegedly did not comply with the ALARA component?

13 **A** I'm aware of situations where, you know,
14 contamination spread offsite due to a situation
15 like that, but I -- I am not aware of any specific
16 citations.

17 **Q** When you say you're aware of those types
18 of situations, were they specific to radionuclides
19 and controlled by the Atomic Energy Commission or
20 the Nuclear Regulatory Commission?

21 **A** Sure. I mean, I think that one example
22 of this situation would be, you know, the
23 contamination along haul roads.

24 **Q** Do you believe there was a citation
25 issued?

1 **A** No, I don't believe there was a citation
2 issued. I don't believe the quantitative
3 standards even cover that scenario, but I think
4 that falls into the category of really not meeting
5 this -- this text, you know, descriptive standard
6 of not as low as reasonably achievable. Certainly
7 it would have been achievable not to spill
8 material off trucks.

9 **Q** But again, you're not aware of any
10 citations being issued under that concept that you
11 just described?

12 **A** I am not.

13 **Q** Okay. Under 20.106, a licensee is
14 allowed to release radioactive material from their
15 cite. Fair?

16 MR. McCLAIN: Object to the form of the
17 question.

18 THE WITNESS: That's a true statement.
19 I mean, that -- that's kind of an example of
20 something I deal with all the time, which is this
21 kind of this question of how clean is clean.

22 BY MR. ZAGER:

23 **Q** Right. So, in other words, under
24 20.106, a licensee can release material from the
25 site as long as it does not exceed the -- the

1 limits stated in 20.106, specifically Appendix B,
2 fair?

3 MR. McCLAIN: Object to the form of the
4 question.

5 THE WITNESS: But here's where this
6 descriptive standard comes in. A licensee isn't
7 expected to -- to purposely or cavalierly release
8 radioactive materials to the environment.
9 There's -- there's a standard there where -- that
10 the quantitative standards are set in such a way
11 as they're attempting to balance reasonable
12 inadvertent releases against the -- the value of
13 whatever activity is happening there.

14 BY MR. ZAGER:

15 Q Okay. My question is really more
16 straightforward than that.

17 A Okay.

18 Q Under 20.106(a), a licensee that is
19 fully compliant with their federal regulatory
20 requirement can still release material from their
21 site, fair?

22 A The standards are -- are quite low, but,
23 yes, that -- that is allowable.

24 Q Okay. You state in your report that
25 you are required to look at 10 CFR 20.106(a),

1 Appendix B, for this case, but are you aware or
2 are you of the opinion that any other federal
3 radiation regulations or standards of care apply
4 to Mallinckrodt in this case?

5 **A I haven't been asked to look at that,**
6 **and I don't have an opinion about that.**

7 Q Okay. Would you agree with me that
8 Mallinckrodt is not a licensee?

9 MR. McCLAIN: Object to the form of the
10 question. These are just legal -- one legal
11 question after another.

12 MR. ZAGER: They're related to his
13 report.

14 MR. McCLAIN: Not really.

15 MR. ZAGER: Okay.

16 MR. McCLAIN: Not really, they're not.

17 MR. ZAGER: Okay.

18 THE WITNESS: I might not --

19 MR. McCLAIN: They're dicta, if you
20 would, and -- and made in passing and -- and using
21 common terms.

22 MR. ZAGER: Okay.

23 MR. McCLAIN: Not legal terms. And now
24 you want to cross-examine him on his legal opinion
25 on all of this stuff. I just don't understand

1 what you're doing.

2 MR. ZAGER: Okay.

3 BY MR. ZAGER:

4 Q You can answer the question.

5 A I might not know the answer to that, but
6 it -- it's my understanding that for the SLAPS
7 site, I'm not aware that Mallinckrodt was a
8 licensee.

9 Q Okay. Are you aware of any federal
10 radiation safety standards or regulations that
11 would apply to government contractors?

12 A That's a pretty broad question. I mean,
13 I think you're edging into sort of a -- a legal
14 arena. I mean, I -- I've heard of this thing
15 about the government contractor exemption, but in
16 general, government contractors in my experience
17 are required to comply with the prevailing
18 environmental standards.

19 Q Are you familiar with the AEC manual
20 chapters that were issued back in the '50s and
21 '60s?

22 A Not deeply familiar with them, no.

23 Q Have you ever looked at them?

24 A I have looked at them.

25 Q Which -- did you know which chapters you

1 looked at -- well, strike that.

2 Did you look at it for this case?

3 **A No, I -- I've just looked at them in the**
4 **past.**

5 Q Okay. Did you review any AEC bulletins
6 for this case?

7 **A No.**

8 Q I may have asked this, and if I did, I
9 apologize. But did you have any of your
10 colleagues or any other experts peer review your
11 report in this case?

12 **A Only Mr. Matos reviewed part of this,**
13 **really just for editorial purposes. We kind of**
14 **have a policy that written documents don't go out**
15 **unless another colleague has looked them over, but**
16 **it was really editorial.**

17 Q Okay. He was the only person that
18 reviewed it?

19 **A Yes.**

20 Q Do you know if Dr. Clark has reviewed
21 it?

22 **A I -- I don't think I would know that.**

23 Q Okay. All right. Do you have a copy of
24 Exhibit 2 in front of you?

25 **A That's my --**

1 Q Your report.

2 A -- original report?

3 Q Yes.

4 A Yes, I do.

5 Q On page 3 of your report, you have a
6 Summary of Opinions, and you actually bold what
7 your opinions are; is that correct?

8 A That's right.

9 Q So your first opinion is: "The SLAPS
10 and Latty Avenue sites were contaminated with
11 radiological materials and metals, and the
12 contamination persisted even after the waste piles
13 were removed." Is that correct?

14 A Correct.

15 MR. McCLAIN: I just want to note that
16 this is -- we're three hours into this deposition,
17 and this is the first question related to his
18 opinions in the case. Just so I have note of it
19 on the record.

20 MR. ZAGER: That's fine.

21 BY MR. ZAGER:

22 Q You note on page 6, which is where you
23 discuss opinion 1, that the on-site structures at
24 SLAPS were razed and demolition debris was buried
25 on the property; is that correct?

1 **A That's what it says, and that's my**
2 **understanding of -- of what happened there.**

3 Q Okay. Now, you talk in here -- let's go
4 to like page 7, for instance.

5 **A Okay.**

6 Q You talk a lot about the -- the FUSRAP
7 documents and U.S. Army Corps of Engineer
8 materials. Why did you think those were important
9 to cite in this case?

10 **A I thought those were important to cite**
11 **because it -- it gives a context of -- of the**
12 **nature and extent of contamination and what sort**
13 **of activities were done to address it.**

14 Q You reviewed all of these reports that
15 you cite, for instance, the Army Corps of Engineer
16 reports and things like that, related to the
17 FUSRAP program?

18 **A Yes, I did. I can't say that I read**
19 **every single page, but, yes, I -- I reviewed these**
20 **reports.**

21 Q All right. And explain to us again what
22 -- what FUSRAP is and what their purpose was with
23 respect to these properties.

24 **A So FUSRAP is a federal environmental**
25 **program. Formerly Utilized Sites Remedial Action**

1 **Program, I think is what it stands for. And**
2 **it's -- it's a program that was implemented first**
3 **in I think 1974, and the whole idea was to**
4 **evaluate and, if needed, clean up sites around the**
5 **country that were related to the Manhattan**
6 **Project, and that -- that might have legacy**
7 **contamination from -- from that work.**

8 Q In any of the Army Corps of Engineer or
9 FUSRAP documents that you reviewed, did any of
10 them apply the 10 CFR Part 20 regulations?

11 A **You're specifically asking about Army**
12 **Corps of Engineers.**

13 Q Yeah, or any of the FUSRAP documents.

14 A **I'm thinking through. I -- I can't say**
15 **for certain that they never did, but I did not**
16 **come across that, and the reason I believe for**
17 **that is that the FUSRAP program generally follows**
18 **the CERCLA process.**

19 Q Okay. In other words, because they
20 followed the CERCLA process, they were not
21 evaluating whether or not there was compliance
22 with the 10 CFR Part 20 regulations back in the
23 '40s, '50s and '60s, fair?

24 A **I -- I don't --**

25 MR. McCLAIN: Object to the form of the

1 question.

2 BY MR. ZAGER:

3 Q Go ahead.

4 A I don't think that -- that the Army
5 Corps of Engineers ever did that. I think their
6 perspective was, It's our job to clean up this
7 site. Let's -- let's get going.

8 Q Okay. In any of the Army Corps of
9 Engineers or FUSRAP documents that you cite in
10 your report, were they critical of Mallinckrodt's
11 operation back in -- from '53 to approximately
12 1966?

13 MR. McCLAIN: Object to the form of the
14 question.

15 THE WITNESS: Not that I can recall.
16 You know, it -- I -- my job is to write reports
17 like that, and I guess I would add the caveat that
18 that's not usually what we do. We don't, you
19 know, usually add a critique of former activities
20 when we're looking at how to characterize or clean
21 up a site. So I would say no, but I would say I
22 wouldn't have expected to.

23 BY MR. ZAGER:

24 Q Okay. In other words, the Army Corps of
25 Engineers' and the FUSRAP's purpose was different

1 than evaluating regulatory compliance back a
2 couple of decades earlier, correct?

3 **A That's true.**

4 Q Okay. In other words, they're going out
5 looking to see what contamination there is in the
6 area, and then they're going to set cleanup
7 levels, correct?

8 **A I mean, there's a whole long process.**
9 **That's not all they do. But that -- that is their**
10 **obligation as I'm sure they interpret it under**
11 **FUSRAP.**

12 Q The cleanup levels that they set are not
13 based on 10 CFR Part 20, correct?

14 **A You know, there's -- there's a lot of**
15 **interplay between those standards and the**
16 **standards that ended up getting applied out there.**
17 **They don't specifically cite, to -- to my**
18 **recollection, Section 20 of 10 CFR, no. They cite**
19 **other things.**

20 **But if you really dig deep and -- and**
21 **try to understand where those cleanup standards**
22 **came from, they -- they're actually interrelated.**

23 Q Okay. But the cleanup levels are
24 actually much lower. They're going in to actually
25 clean something up with the hopes that then the

1 site can be unrestricted use, fair?

2 **A** I don't know that I would say they're
3 much lower. I mean, they're really measuring
4 different things, aren't they? I mean, they're --
5 you know, the Table 2 values are effluent
6 limitations. That's the Table 2 in Section 20.
7 Those really were never meant to be cleanup
8 standards. They were meant to be proxies for the
9 threat of exposure.

10 Q They're release standards, correct?

11 **A** That's right.

12 Q Then your second opinion is that --
13 strike that. Let me back up.

14 With respect to your first opinion
15 regarding that there's -- there's contamination in
16 the area -- again, we've already talked about
17 under the 10 CFR Part 20 regulations. When
18 Mallinckrodt was operating the site, the SLAPS
19 site, they were allowed to release material,
20 correct?

21 MR. McCLAIN: Object to the form of the
22 question.

23 THE WITNESS: There were specific
24 limitations, and there were also descriptive
25 limitations on -- on the magnitude of those

1 releases, but I would argue that, yes, there --
2 that a certain degree of release was allowable.

3 BY MR. ZAGER:

4 Q So Mallinckrodt back '53 to 1966 was
5 allowed to release material, and then the
6 government, through the Army Corps of Engineer,
7 came in a decade or two later and evaluated the
8 contamination in the area.

9 MR. McCLAIN: Object --

10 BY MR. ZAGER:

11 Q Is that the general setup?

12 MR. McCLAIN: Object to the form of the
13 question. It calls for a legal conclusion.

14 BY MR. ZAGER:

15 Q You can answer.

16 MR. McCLAIN: Not being cited for
17 release is different than being allowed to
18 release.

19 MR. ZAGER: Counsel, don't coach the
20 witness. Come on.

21 BY MR. ZAGER:

22 Q You can answer.

23 MR. McCLAIN: Well, there's a
24 difference.

25 MR. ZAGER: There's not a difference

1 between coaching the witness. You can object to
2 the form, but --

3 MR. McCLAIN: Well, there -- there's a
4 difference in your question.

5 BY MR. ZAGER:

6 Q Do you even remember what the question
7 was after all that?

8 **A Let's try it again.**

9 Q Okay. The general setup here was that
10 back in 1953 to 1966, when Mallinckrodt --
11 Mallinckrodt was operating the SLAPS site, under
12 the regulations that you're applying, they were
13 allowed to release material as long as they didn't
14 exceed the limits, fair?

15 MR. McCLAIN: Object to the form of the
16 question.

17 THE WITNESS: That's correct, with the
18 caveat that we've already talked also about these
19 descriptive limits that I think also apply.

20 BY MR. ZAGER:

21 Q Right. The FUSRAP program that we're
22 talking about is the federal government, through
23 the Army Corps of Engineers, coming back to these
24 sites, like SLAPS, decades later, evaluating
25 whether or not there's contamination, and then

1 deciding if they want to clean it up and to what
2 extent.

3 Is that the general process that we're
4 talking about here?

5 **A I -- I know I'm being nitpicky, but I**
6 **don't think I would describe that process as**
7 **whether or not they want to clean it up but**
8 **whether or not they need to clean it up. But**
9 **that's -- cleaning up these sites was what FUSRAP**
10 **was and still is all about.**

11 Q Okay. Then your -- your second opinion
12 is: "Contamination, including radiologic
13 materials and metals, has escaped from the SLAPS
14 and Latty Avenue sites and impacting neighboring
15 properties by a number of migration pathways."

16 Is that correct?

17 **A That's correct.**

18 Q Okay. And with respect to that, you
19 talk about runoff and surface water, correct?

20 **A Right.**

21 Q And then also the contaminants in the
22 surface water?

23 **A Correct.**

24 Q You talk about air dispersements of
25 windblown dust and radon, correct?

1 **A Right.**

2 Q And then we also have groundwater flow,
3 correct?

4 **A Right.**

5 Q All of those collectively, as they leave
6 the site, would be what's known as effluents?

7 **A There's different terms that are -- that**
8 **are used by different agencies, but we can --**
9 **sure, we can call them effluents.**

10 Q Under the standard of care that you're
11 applying in this case, specifically 10 CFR
12 20.106(a) from 1960, the runoff of the surface
13 water and the air dispersements as well as
14 contaminants in both of those and the groundwater
15 would all be characterized as effluents; is that
16 correct?

17 **A Yes.**

18 Q You also mention the spillage on the
19 haul roads.

20 **A Can I back up? I'm sorry.**

21 Q Sure.

22 **A I didn't want to get ahead of ourselves.**
23 **As I point out in the report, there --**
24 **there isn't an effluent guideline for contaminated**
25 **sediments. So that's something that's important**

1 **in this case that's just not quantitatively**
2 **addressed in the Appendix B tables.**

3 Q Right. The sediments are carried -- or
4 potentially could be carried offsite with the
5 water, correct?

6 A **Correct.**

7 Q Given that these sediments are mixed in
8 with the water, aren't they part of the water
9 effluent limitations?

10 A **I don't think so. I -- I think the**
11 **water effluent limitations are meant to describe**
12 **dissolved contaminants in water, not particulate**
13 **contaminants.**

14 Q What is your basis for saying that the
15 water effluent limitations are supposed to include
16 dissolved sediment but not solidified sediment?

17 A **Well, it's not really dissolved**
18 **sediment. It's dissolved compounds.**

19 Q Okay.

20 A **My basis for that is there's nothing in**
21 **the regulatory language that talks about including**
22 **particulates, and it's standard practice to filter**
23 **sediments out of surface water or groundwater**
24 **before we send them to the lab.**

25 **So in the absence of any kind of**

1 **specific guidance, in my business we usually**
2 **assume that if people are talking about water**
3 **standards, say like drinking water standards,**
4 **you're talking about dissolved standards.**

5 Q Is there anything in 20 CFR -- strike
6 that.

7 Is there anything in 10 CFR 20.106(a)
8 that says that when you're talking about water
9 effluent that you're supposed to filter out
10 sediment?

11 A **It's silent about that, to my knowledge.**

12 Q So it certainly doesn't say to -- to
13 strain it out.

14 A **No, but that would be standard practice.**

15 Q I understand you may be -- that may be
16 standard practice in what you're doing today.
17 With respect to back in 1960, when these
18 regulations were put in place, do you have
19 information as to what the standard of care was
20 then?

21 A **Well, I don't have information as to**
22 **what was explicitly in the minds of the folks**
23 **who -- you know, who constructed Table 2. But my**
24 **understanding is that really throughout the**
25 **history of -- of environmental testing in the**

1 **States, when we talk about water concentrations,**
2 **we're talking about dissolved concentrations.**

3 Q Okay. But there's nothing specific to
4 how that would apply to 10 CFR 20.106(a),
5 specifically the 1960 version, fair?

6 A **To my knowledge, it's silent on that.**
7 **So that's an assumption I'm making based on my**
8 **professional experience.**

9 Q Okay. You also mention with respect to
10 opinion 2 the spillage on the haul roads. Do
11 you -- do you see that?

12 A **Let's see.**

13 Q And, actually, it's probably on page 3
14 where you summarize it.

15 A **(Peruses document.)**

16 I -- I agree with you, I think it's in
17 **here, but I -- I'm not seeing it right now.**

18 Q Well, where I'm looking at is on page 3.

19 A **Okay.**

20 Q The last full paragraph -- it's actually
21 the last couple of words, "resuspension from
22 roads."

23 A **Oh, okay.**

24 Q I'm assuming that's talking about
25 spillage.

1 **A Okay. Yes.**

2 Q Okay. Have you analyzed Mallinckrodt's
3 responsibility, if any, for material that was on
4 the roads?

5 **A I haven't specifically analyzed**
6 **Mallinckrodt's responsibility for that.**

7 Q Are you aware or can you quantify any
8 material that was allegedly spilled on the roads
9 from Mallinckrodt, Mallinckrodt doing the actual
10 trucking?

11 **A Well, there are analyses where -- where**
12 **folks have tried to kind of sort out what the haul**
13 **routes were from Mallinckrodt to SLAPS as opposed**
14 **to from SLAPS to Latty Avenue. So there has been**
15 **some analysis, and I'm aware of that analysis on**
16 **that distinction, but I'm not aware of any**
17 **analysis, and I haven't performed it, as to**
18 **whether or not there might be any commingling.**

19 Q Okay. With respect to the transport on
20 the roads, whether it's from downtown to SLAPS --
21 well, strike that.

22 With respect to the travel from downtown
23 to SLAPS of the material, do you know to what
24 extent Mallinckrodt was doing that transport, as
25 opposed to other contractors for the government?

1 **A It's my understanding that Mallinckrodt**
2 **was transporting this material. Whether or not**
3 **there might have been other contractors, I -- I**
4 **haven't seen any references to that.**

5 Q Okay. With respect to any material that
6 was allegedly spilled by Mallinckrodt on the haul
7 roads, are you able -- do you have sufficient data
8 to calculate whether or not it was in excess of
9 the release limitations stated in 10 CFR Part
10 20 -- 10 CFR 20.106(a)?

11 MR. McCLAIN: Object to the form of the
12 question. That's an incorrect standard to the
13 wrong activity.

14 Are we -- are we going to stop at lunch
15 for some point? Or what -- what's your plan?

16 MR. ZAGER: It's up to you. I don't
17 care.

18 MR. McCLAIN: Huh?

19 MR. ZAGER: I don't care.

20 MR. McCLAIN: I mean how many -- you've
21 got hours to go, right?

22 MR. ZAGER: At least probably two, yeah.

23 MR. McCLAIN: So I don't know, Jim, what
24 you want to do.

25 THE WITNESS: I would like to take a

1 lunch break at -- at some natural breaking point.

2 MR. McCLAIN: Okay.

3 MR. ZAGER: Okay. Let's -- let's finish
4 this question up.

5 THE WITNESS: Okay.

6 I think that's an example of -- of a
7 situation that isn't -- isn't fully covered by the
8 quantitative standards in Section 20, 10 CFR. And
9 so that's a situation where I would look to the
10 descriptive standard of as low as reasonably
11 achievable. And I would suggest that it certainly
12 would have been achievable, you know, to not spill
13 some of this stuff as they were hauling the waste
14 from one place to another.

15 BY MR. ZAGER:

16 Q So you believe it would be achievable in
17 transport to have zero waste spill?

18 MR. McCLAIN: Yeah.

19 THE WITNESS: Virtually -- virtually
20 zero waste spill, I think that would be
21 achievable. I mean, I think we -- we actually
22 achieve that these days.

23 BY MR. ZAGER:

24 Q Okay. Out -- well, these days in 2019,
25 is that what you're saying?

1 **A Well, sure. Yeah.**

2 **Q Okay. Have you analyzed the technology**
3 **that was available back in '53 to -- or '46 to**
4 **'53, '55?**

5 **A Well, you know --**

6 MR. McCLAIN: A canvas cover?

7 BY MR. ZAGER:

8 **Q You can answer.**

9 **A This isn't really high-tech technology,**
10 **and I'm not a trucker, but I think it's -- even in**
11 **the '50s and the '60s, it would have been readily**
12 **possible to transport stuff like dirt in trucks**
13 **and spill virtually none of it.**

14 Would -- would a couple -- you know,
15 **would possibly some particles escape during**
16 **loading and unloading, yeah, sure. But along the**
17 **trucking route, I think that would be possible.**

18 **Q But specific to Mallinckrodt and any**
19 **transportation activities it was involved in, you**
20 **haven't analyzed the quantity of any material that**
21 **was lost. Is that fair?**

22 **A That's fair, I'm not aware that anyone**
23 **has done that. I mean, there's been a lot of work**
24 **looking at the nature and extent of contamination**
25 **that -- that was released that way, and the**

1 **concentration levels. But in terms of**
2 **back-calculating some kind of mass or amount, I'm**
3 **not sure that could be done.**

4 Q Okay. You also write on page 10 of your
5 report, it's down at the bottom, it says: "Of
6 particular note, researchers have concluded that
7 an important exposure pathway at this site is
8 transport and redistribution of contaminated
9 sediments down Coldwater Creek and its flood
10 plane, especially during flood events which had
11 the potential to deposit contaminated sediments
12 directly into the yards of residential properties
13 that abut the creek."

14 Did I read that correctly?

15 **A Yes.**

16 Q Okay. And then you've got a couple of
17 cites there.

18 Specifically, what do -- what do those
19 reports talk about that supports that proposition,
20 because you didn't quote that?

21 **A I'm not sure what you mean I didn't**
22 **quote that. I don't know what that means.**

23 Q I mean I don't see quote marks. In
24 other words, that that's kind of you paraphrasing.

25 **A Oh. Yeah, it is me paraphrasing.**

1 Well, I mean, there have been studies,
2 you know, all the way back actually to the '60s
3 regarding releases by way of surface water
4 sediments. I think Oak Ridge National Lab sent a
5 crew out there '67 or '68, and they looked at the
6 ditches in -- in and -- on and adjacent to the
7 SLAPS site.

8 Subsequently, Army Corps of Engineers in
9 the '90s and 2000s did a very significant amount
10 of investigation along the waterway, and what they
11 found were elevated levels of radioactive
12 materials in the sediments along Coldwater Creek.

13 Q All right. When you say "elevated
14 levels" -- strike that.

15 Was it elevated levels of radionuclides?
16 What was your word?

17 A I think I said "radioactive materials."

18 Q Okay. When you say that they found
19 elevated levels of radioactive materials, you're
20 talking about elevated above natural background,
21 correct?

22 MR. McCLAIN: Object to the form of the
23 question.

24 THE WITNESS: We could talk about that,
25 but we could also talk about them being elevated

1 above the Army Corps of Engineers' cleanup
2 standards, at least in places.

3 BY MR. ZAGER:

4 Q Okay. The studies that you just
5 referred to that looked at sediment in this --
6 these transport sediments, did any of them compare
7 it or evaluate it against the radiation safety
8 standards, specifically 10 CFR 20.106?

9 A No. And I -- I don't believe that would
10 have been applicable for the work they were doing.

11 Q Why wouldn't it be applicable to what
12 they were doing?

13 A Well, what they were really looking at
14 is the aftermath of -- of the sort of releases
15 that we've been talking about, you know,
16 throughout the morning, as opposed to discharges
17 or effluent concentrations at the time.

18 Q Okay. You also note on page 11 of your
19 report, you have this inset quote about
20 "Concentrations of thorium-230 in the sediment
21 range from 0.2 to 1400 picocuries per gram."

22 Do you see that?

23 A I do see that.

24 Q You then write: "Sediment with elevated
25 levels of radioactive material is intermittently

1 located in creek bins where natural settling would
2 occur."

3 Did I read that correctly?

4 **A Yes.**

5 Q Okay. So, in other words, they're
6 finding the -- the radioactive materials,
7 specifically the thorium-230, U-238 and Ra-226,
8 but it's in areas where they would expect to find
9 it if it's flowing down the river where it
10 naturally would settle, fair?

11 **A Sure, but also they're finding it up in**
12 **what we would consider to be the flood planes. So**
13 **there -- there are a couple of different dynamics**
14 **that come into play when you have sediment**
15 **transport down a river, but in terms of it being**
16 **where we would expect it, in terms of things like**
17 **fluvial geomorphology, I -- I generally agree with**
18 **that.**

19 Q Okay. And then they note that the
20 contamination levels are highest near SLAPS and
21 HISS, but they decrease greatly downstream,
22 correct?

23 **A This is a quotation from the Army Corps**
24 **of Engineers, and that's stated correctly.**

25 Q Down in the next sentence you say:

1 "Mallinckrodt and Cotter would have been aware of
2 these issues because AEC had observed and reported
3 uncontrolled releases of contaminated sediment at
4 least by 1948."

5 Did I read that correctly?

6 **A Yes.**

7 Q Okay. When you say "aware of these
8 issues," what are you talking about?

9 **A I'm talking about -- about waste from**
10 **the waste piles washing into the ditches that**
11 **reached the creek from SLAPS and Latty Avenue.**

12 Q Okay. First, let's back up a second.

13 You do agree still that while
14 Mallinckrodt was operating the site, releases from
15 the site were permitted as long as they did not
16 exceed 20.106, correct?

17 MR. McCLAIN: I -- I object to the form
18 of the question as to "permitted."

19 BY MR. ZAGER:

20 Q You can answer.

21 **A Well, I'm -- I'm a broken record here,**
22 **but there's also a descriptive standard of ALARA,**
23 **and I've also mentioned before that sediments are**
24 **really not covered quantitatively in Appendix B,**
25 **Table 2. So this is -- this is something that did**

1 **not at the time have a quantitative standard in my**
2 **opinion.**

3 Q Okay. But again, your opinion is -- is
4 not based specifically on what's stated in 20.106,
5 correct?

6 MR. McCLAIN: Object to the form of the
7 question.

8 THE WITNESS: Well, it is based on that,
9 because Section 20 of 10 CFR does articulate the
10 intention of all of these rules, and the intention
11 is ALARA.

12 BY MR. ZAGER:

13 Q Well, but then it then provides specific
14 tables stating the limits on the annual average
15 release rates, correct?

16 A That's right, for certain media, but not
17 all media. The -- you know, one way to look at
18 this is the writers of this code, I'm not in their
19 minds, but they perhaps wisely recognized that
20 they couldn't foresee every single scenario by
21 which radiological material might get released
22 into the environment or offsite from a facility,
23 so they include this descriptive narrative. I
24 think it should be applied to these sorts of
25 releases that aren't covered quantitatively.

1 Q That's assuming -- or that's based on
2 your assumption that the water effluent limitation
3 doesn't include sediment contained in the water,
4 fair?

5 A **Well, it's based on more than that, but**
6 **that is -- that is an assumption that I've made**
7 **also.**

8 Q So if I'm an Atomic Energy Commission
9 inspector back in 1960, and I go out and I grab a
10 water sample and we take it back to the lab, are
11 you saying that I would have strained out any
12 sediment that was collected in that material?

13 MR. McCLAIN: Object to the form of the
14 question.

15 THE WITNESS: Generally that's -- that's
16 what we do when we collect water samples, unless
17 you're specifically choosing not to for some
18 reason.

19 BY MR. ZAGER:

20 Q But my question is very specific to the
21 Atomic Energy Commission inspectors back in 1960.

22 Do you have any evidence to suggest that
23 if they go out and collect that water sample, that
24 they strain the sediment out and then just test
25 what's in the water?

1 **A** **I reviewed those -- those inspection**
2 **reports, and they just don't go into that kind of**
3 **detail about the protocols that they used. But**
4 **based on my professional experience, that's what**
5 **water sampling means.**

6 **Q** Okay. Have you performed water sampling
7 for compliance with 20.106?

8 **A** **No, I haven't.**

9 **Q** The reports that you reviewed by the
10 Atomic Energy Commission on their water sampling,
11 did they say anything about straining out
12 sediment?

13 **A** **They -- they don't speak to their**
14 **protocols at all.**

15 **Q** All right. But you certainly wouldn't
16 expect them to say that they didn't do something,
17 would you?

18 MR. McCLAIN: That they didn't do
19 something?

20 MR. ZAGER: Right.

21 MR. McCLAIN: What?

22 BY MR. ZAGER:

23 **Q** They wouldn't say, We didn't strain out
24 the sediment. You wouldn't expect to see that in
25 a report, would you?

1 MR. McCLAIN: Objection. Calls for
2 speculation.

3 THE WITNESS: You know, that reminds me
4 of a mentor I had once who told me in writing
5 reports don't -- you know, don't tell people what
6 you didn't do; tell them what you did do.

7 But, you know, they just don't -- they
8 just don't provide their -- their protocol.

9 BY MR. ZAGER:

10 Q Okay. But following --

11 A However, if I could add, upon -- upon
12 finding elevated levels of radionuclides in the
13 sediment of the ditches, they -- they did take
14 measures to stop offsite transport or minimize
15 offsite transport by re-engineering the ditches
16 and putting in a settling pond. So they did see
17 that as a problem.

18 Q When did they put in the settling pond?

19 A I'm not exactly sure when that was.

20 Q Was it while the Atomic Energy
21 Commission was still operating the site as its own
22 entity?

23 A I'm going to have to look up the date.
24 The date is just not --

25 Q Okay.

1 **A -- not coming to mind.**

2 Q Going back to this statement, though,
3 about Mallinckrodt and Cotter would have been
4 aware of this issue because AEC had observed and
5 reported uncontrolled releases of contaminated
6 sediment at least by 1958, you're talking about a
7 1948 Atomic Energy Commission document; is that
8 correct?

9 **A That's correct.**

10 Q Do you know if anybody from Mallinckrodt
11 ever received that 1948 document?

12 **A I don't have any information about that**
13 **one way or another.**

14 Q You agree with me, though, it was an AEC
15 document written by an AEC employee, correct?

16 **A It was.**

17 Q Further down in that same paragraph, you
18 state, after talking about this 1948 AEC document:
19 "But what is clear from my initial review,
20 including the inspection reports, is that there
21 were serious violations of regulations at both
22 sites."

23 Did I read that correctly?

24 **A Yes.**

25 Q Okay. First off, the inspection reports

1 that you're talking about, what inspection reports
2 did you review?

3 **A Well, what I'm talking about here are**
4 **the -- are a couple of things, including, for**
5 **example, this 1948 report about uranium**
6 **contamination at the airport storage site. Then**
7 **there are inspection reports from the '60s at the**
8 **Latty Avenue site.**

9 Q Okay. So those are the reports you're
10 talking about there, correct?

11 **A Correct.**

12 Q You then state: "There were serious
13 violations of regulations at both sites."

14 We don't need to jump ahead if -- if
15 it's covered later in the report, but the
16 serious regulations that you're talking -- well,
17 identify the serious regulations you're talking
18 about. Strike that. I jumbled that question.

19 Identify the serious violations of
20 regulations that you're talking about on page 11.

21 **A The violation of regulations that I'm**
22 **talking about there are that these sites were not**
23 **operated in such a way as to keep releases of**
24 **radiological materials from the facility as low as**
25 **is reasonably achievable.**

1 Q So you're applying the ALARA principle
2 there.

3 A Now, later on we learn that the
4 contamination as a result of -- of these
5 discharges led to contaminated soil and
6 contaminated sediments that exceeded cleanup
7 standards, but I acknowledge that in the '40s and
8 '50s, those standards probably hadn't been
9 promulgated.

10 Q Okay. You're certainly not suggesting
11 that Mallinckrodt should be held liable or
12 responsible for activities from 1953 to early 1966
13 based on cleanup standards that were put in place
14 years later, including probably two decades later,
15 are you?

16 MR. McCLAIN: Objection. Calls for a
17 legal conclusion.

18 MR. ZAGER: It's his opinion. He said
19 it.

20 BY MR. ZAGER:

21 Q Go ahead.

22 MR. McCLAIN: No, his -- his opinion
23 about what needs to be cleaned up or what -- what
24 needs to be cleaned up aren't based upon whether
25 or not or when the statute came into effect.

1 MR. ZAGER: Okay.

2 BY MR. ZAGER:

3 Q You can -- let me rephrase the question.

4 You've written a report and you're
5 talking about violations of regulations, correct?

6 A Yes.

7 Q All right. The regulations that you're
8 alleging were violated and that you're going --
9 you're going to testify to in this trial, do they
10 include the cleanup standards that were put in
11 place years later?

12 A No, I look at that as a consequence
13 of -- of activities that were in violation of the
14 regulations that were in place at the time.

15 Q Okay. And we've already talked about
16 the fact that Mallinckrodt was a contractor to the
17 Atomic Energy Commission, correct?

18 A That's correct. I -- I've mentioned
19 that I don't have an awareness of the nature of
20 the contracts, but we did talk about that.

21 Q Right. Have you evaluated the oversight
22 by the Atomic Energy Commission of Mallinckrodt
23 during that time period at SLAPS from 1953 to
24 1966?

25 A No.

1 Q Okay. Were you aware that the Atomic
2 Energy Commission had an actual office in
3 St. Louis?

4 **A Yes, I am.**

5 Q And it was actually in Mallinckrodt's
6 facilities or on Mallinckrodt's facilities in the
7 downtown site.

8 **A I don't really have knowledge of where**
9 **it was, but I believe you.**

10 Q All right. You mentioned earlier that
11 you looked at inspection reports, and those were
12 inspection reports completed by inspectors from
13 the Atomic Energy Commission going out and looking
14 specifically at the sites, correct?

15 **A That's correct.**

16 Q In your report you identify notices of
17 noncompliance issued by the AEC; is that correct?
18 You refer to several of them.

19 **A Yes.**

20 Q Okay. Did you ever identify a notice of
21 noncompliance issued by the Atomic Energy
22 Commission to Mallinckrodt?

23 **A No.**

24 Q You've mentioned the ALARA principle
25 several times. Did you ever identify any writing

1 or citation from the Atomic Energy Commission
2 stating that Mallinckrodt was in violation or not
3 following the ALARA principle?

4 **A I haven't seen anything like that in the**
5 **historical documentation.**

6 Q Then on page 11, you state --

7 MR. McCLAIN: Jim, when do you want to
8 have lunch? Because this is just going to keep
9 going on until you say stop.

10 THE WITNESS: What time is it getting to
11 be?

12 MR. ZAGER: It's 12:25. If you want to
13 stop, we can stop. Are you ready for a lunch
14 break?

15 THE WITNESS: Yeah, I'm ready for a
16 lunch break.

17 MR. ZAGER: Okay. What do you guys want
18 to do?

19 MR. McCLAIN: How would we know?

20 THE VIDEOGRAPHER: Going off the record.
21 The time is 12:25 p.m.

22 (Lunch recess.)

23 THE VIDEOGRAPHER: Going on the record.
24 The time is 1:15 p.m.

25 BY MR. ZAGER:

1 Q Dr. Wells, before the break, we started
2 looking at page 11 of your report, which has been
3 marked as Exhibit 2, your original report. Let's
4 go ahead and take a look at the bottom of page 11.

5 Are you there?

6 **A Yes, I am.**

7 Q Okay. The last full sentence says: "To
8 my knowledge, there's never been a serious
9 investigation in whether Mallin-" -- I'm sorry,
10 "whether AEC, Mallinckrodt, and/or Cotter allowed
11 other entities to remove waste from SLAPS or Latty
12 Avenue for use as fill in construction projects."

13 Did I read that correctly?

14 **A Yes.**

15 Q And, actually, right above that, you
16 refer to this January 20, 1989, letter to the
17 St. Louis Airport Authority. Correct?

18 **A Correct.**

19 Q I just want to be clear, are you
20 offering any opinions in this case that
21 Mallinckrodt allowed waste to be taken from SLAPS
22 and used as fill material in construction
23 projects?

24 **A No. What I'm really doing here is to --**
25 **to point out that that's another migration pathway**

1 that we've observed at different kinds of sites,
2 like uranium mine tailing sites. And as I say
3 here, you know, we really -- there doesn't appear
4 to be any information about whether that happened
5 or to what degree.

6 Q I don't want to belabor the point if
7 you're not directing that at Mallinckrodt.

8 Is it fair to say that at this point in
9 time you don't have any evidence that Mallinckrodt
10 did anything inappropriate with the waste
11 materials at SLAPS as far as allowing them to be
12 taken offsite and used as fill material?

13 A I think the way I'd answer that is I --
14 I don't have any information about that one way or
15 the other.

16 Q Okay. Let's go then to the next page,
17 Exhibit 12 of your report, specifically opinion 3,
18 which states: "Past offsite effluent
19 concentrations, air, water and sediment can be
20 estimated at the boundaries of SLAPS and Latty
21 Avenue using existing data and modeling."

22 Did I read that correctly?

23 A Correct.

24 Q Okay. First, you mentioned modeling
25 there. Did you perform any modeling?

1 **A I performed some calculations, but I**
2 **don't think I would call it modeling.**

3 **Q Okay. The calculations you're talking**
4 **about are referred to in your report?**

5 **A They are indeed.**

6 **Q Okay. Did you rely on any modeling that**
7 **was done by others?**

8 **A Yes, I did.**

9 **Q What modeling did you rely on that was**
10 **done by others?**

11 **A I relied on modeling that was done**
12 **actually by Dr. Till and his team in the 2018 RAC**
13 **report.**

14 **Q Okay. How did you use the modeling that**
15 **was done by Dr. Till in the 2018 RAC report?**

16 **A Well, like, for example, for the Latty**
17 **Avenue site, Dr. Till did an analysis of airborne**
18 **flux of contaminants due to the waste drying**
19 **operation. And he didn't -- he had his own**
20 **purposes. He didn't calculate these effluent**
21 **limitations or effluent concentrations at the**
22 **fence line.**

23 **So I was able to use his modeling to**
24 **derive some additional information that would be**
25 **relevant to my report.**

1 Q All right. That was specific to Latty
2 Avenue?

3 **A Right.**

4 Q Did you use Dr. Till's modeling from his
5 2018 report for anything related to SLAPS?

6 **A Let me just review this work. (Peruses**
7 **document.)**

8 **No, I really didn't use any modeling**
9 **results from Dr. Till's work on the SLAPS site.**

10 Q Okay. In the, I guess, second full
11 paragraph that starts with "Briefly," you write:
12 "Briefly, it is my opinion that effluent
13 limitations for water may not have been exceeded,
14 but effluent limitations for air were exceeded at
15 both SLAPS and Latty Avenue."

16 Did I read that correctly?

17 **A Yes.**

18 Q All right. Let's break that in -- into
19 two parts.

20 First, where it says, "it is my opinion
21 that effluent limitations for water may not have
22 been exceeded," is that still your position?

23 **A That is still my position. I think I**
24 **would -- if I was rewriting this, which I don't**
25 **intend to do, I would -- I would say it a little**

1 differently, which is we don't have enough
2 information to determine that. But -- so another
3 way to put it would be the available evidence,
4 which is pretty incomplete, doesn't show effluent
5 limitation exceedances for water.

6 Q Okay. You and I talked earlier about
7 your position that the sediment content of water
8 discharged offsite is not part of the limit for
9 the water effluent releases, correct?

10 A That's my interpretation.

11 Q Do you have any data or measurements of
12 the sediment that was allegedly released at the
13 fence line from SLAPS?

14 A Well, there -- there is some data on
15 that. I mean, going back to the 1948 AEC report,
16 they measured contaminant levels in what they
17 called mud. But then later on in the late '60s,
18 there were studies that were done by Oak Ridge
19 National Laboratory or its contractors that also
20 looked into sediment concentrations.

21 And then subsequently, U.S. Army Corps
22 of Engineers under the FUSRAP program collected a
23 lot of data, not only near the fence line but also
24 down gradient.

25 Q Okay. The 1948 testing was done by the

1 Army -- I'm sorry, that was done by the Atomic
2 Energy Commission, correct?

3 **A I think that's correct.**

4 Q Assuming that Mallinckrodt's operations
5 at SLAPS did not start until they were under
6 contract on July 20th, 1953, then the releases
7 reported in the 1948 report would have occurred
8 before Mallinckrodt was managing SLAPS, correct?

9 **A I believe that is correct.**

10 Q Okay. You mentioned some testing in the
11 1960s that was done by Oak Ridge. Do you know
12 when that was done?

13 **A Let's see. (Peruses document.)**

14 **I'm not seeing the report cited here. I**
15 **think it is cited, but there is -- there was a**
16 **report about a characterization of ditches, and so**
17 **I don't have the exact date.**

18 Q Then you also talked about the Army
19 Corps of Engineer data. That would have been
20 collected as part of the FUSRAP program, correct?

21 **A Correct.**

22 Q For any of that data other than -- well,
23 let's exclude the -- the 1948 because we know that
24 that was earlier.

25 But the Oak Ridge laboratory testing or

1 the Army Corps of Engineer FUSRAP testing, does
2 any of that allow you to determine or quantify
3 releases in a given year or a given 12-month
4 period?

5 **A I haven't been asked to do that. As I**
6 **sit here, I don't want to say that that's not**
7 **possible because I -- I might be able to think**
8 **about that and think of -- try to think of a way**
9 **of reconstructing that kind of detailed**
10 **information. But as I sit right here, I -- I just**
11 **think there's not enough time series data to be**
12 **able to be that precise.**

13 **Q** Okay. Then with respect to the second
14 part of that sentence where it talks about
15 effluent limitations for air were exceeded at both
16 SLAPS and Latty Avenue, looking specifically at
17 SLAPS, I believe you're going to talk about
18 releases of radon-222 and thorium-230; is that
19 correct?

20 **A Well, it's the -- my opinion that it's**
21 **radium-230 that did exceed the effluent guideline.**

22 **I have some tabulations here of multiple**
23 **elements, radionuclides. It's all derived**
24 **actually from a uranium measurement.**

25 **Q** Rather than get bogged down on this

1 sentence, I'm just asking --

2 **A Yeah.**

3 Q -- the specific opinions that you have
4 about effluent limitations for air being exceeded
5 at SLAPS, those are then addressed in more detail
6 in your report, fair?

7 **A Yes, they are.**

8 Q Okay. Let's go to page 13 of your
9 report. In the first full paragraph you write:
10 "I am not aware of any comprehensive surface water
11 sampling from either the SLAPS site or Latty
12 Avenue prior to removal of the waste piles."

13 Did I read that correctly?

14 **A Yes.**

15 Q All right. What surface water sampling
16 have you seen from SLAPS prior to the -- the waste
17 piles being removed?

18 **A There's surface water sampling, again**
19 **conducted in 1948, and then there are annual**
20 **monitoring reports that include sampling of water**
21 **and air through the '60s. I haven't seen every**
22 **single one, but I think that there are annual**
23 **reports that were produced regarding the SLAPS**
24 **site.**

25 Q Okay. So when you say that you haven't

1 seen comprehensive surface -- for surface water
2 sampling, what do you believe you have not seen?

3 MR. McCLAIN: Objection.

4 THE WITNESS: Well, what I haven't seen
5 is the kind of sampling that Army Corps of
6 Engineers, you know, broadly conducted much later.
7 So because surface water, like many environmental
8 media, is super variable in terms of its ability
9 to transport contamination, you -- one needs a
10 fairly robust sampling program or monitoring
11 program in order to fully characterize the nature
12 of a release or a potential release.

13 So we have some scattered data, but, you
14 know, it -- as -- as I answered your last question
15 or -- or a few questions ago, it's really not
16 enough to get a good handle of what the
17 concentrations were in a given year, when the
18 waste piles were still there, what were they like
19 during the rainy season as opposed to the dry
20 season, things like that.

21 BY MR. ZAGER:

22 Q Okay. So you just simply don't have
23 enough -- you haven't seen enough data, although
24 there is some testing data, fair?

25 A **There is some testing data, and we also**

1 **know from after the fact that there's, you know,**
2 **contamination down Coldwater Creek. So that tells**
3 **us a little something about the mass flux, but**
4 **I -- I would generally agree with your question.**

5 Q Okay. In your review of materials in
6 this case, did you find anything where the Atomic
7 Energy Commission was critical of the level or
8 quantity of testing that Mallinckrodt was
9 performing of the water or of the air?

10 A **I didn't see any documentation of that**
11 **sort.**

12 Q Okay. You -- you mention in that same
13 paragraph later, and you're talking about some
14 testing that was done in 1948, that the -- the
15 measurement corresponds to 7,000, I guess it would
16 be, micrograms per liter, which vastly exceeds the
17 current drinking water standard for uranium of
18 30 micrograms per liter. Is that correct?

19 A **Correct.**

20 Q All right. You're certainly not saying
21 that the current drinking water standard applied
22 to anything that Mallinckrodt did back from '53 to
23 '66, are you?

24 MR. McCLAIN: Object to the form of the
25 question.

1 THE WITNESS: That's not what I'm really
2 saying here. What I'm saying here is that of the
3 sparse data that we do have, that there are
4 indications that there was a lot of contamination,
5 you know, flowing down that creek, at least at
6 times, and we don't have enough information to
7 fully reconstruct that mass flux.

8 BY MR. ZAGER:

9 Q You mentioned that the measurement
10 corresponds to 7,000 micrograms per liter. What
11 was the standard at that time?

12 A To my knowledge, there would not have
13 been a drinking water standard for uranium at that
14 time, at least not nationwide.

15 Q What was the standard under the 1960
16 10 CFR 20.106 standard?

17 A Well, that's where it starts to get a
18 little complicated. There -- there isn't a
19 standard as expressed in these units. See, these
20 are mass units, and the standards in 10 CFR
21 Section 20 are in activity units of individual
22 radionuclides, and so there -- there actually is
23 not a standard for just total uranium measured as
24 a mass, as a concentration.

25 Q Did you take the 7,000 micrograms per

1 liter that was reported in the AEC testing from
2 1948 and break that out for any particular
3 radionuclides so that you could compare it to the
4 20.106 release limits?

5 **A No, I didn't do that.**

6 **(Exhibit No. 7 was marked for**
7 **identification.)**

8 BY MR. ZAGER:

9 Q I'm going to hand you what I marked as
10 Exhibit 7.

11 Just go ahead and take a look at that,
12 and tell me if you recognize that document.

13 **A (Peruses document.)**

14 **Yeah, this looks like the 1948 sampling**
15 **document that we've been talking about.**

16 Q That's dated November 1st, 1948?

17 **A That's correct.**

18 Q Okay. Down at the bottom of the cover
19 page, is it marked "Confidential"?

20 **A It is.**

21 Q Is there any suggestion on here that
22 this report was sent to -- strike that.

23 Is there any type of carbon copy or
24 anything like that that lists Mallinckrodt as
25 being a recipient of this report?

1 MR. McCLAIN: Objection to the document.

2 It's its own best evidence.

3 THE WITNESS: There is actually no
4 recipients at all that are, you know, listed on
5 this report.

6 MR. McGAHREN: What number is this one?

7 MR. ZAGER: It's No. 7.

8 MR. McGAHREN: Thank you.

9 BY MR. ZAGER:

10 Q Let's go to the second page of
11 Exhibit 7.

12 Down below the numbers or the numbered
13 paragraphs, it says: "However, no final
14 conclusion should be drawn from these samples."

15 Did I read that correctly?

16 A I'm sorry, I'm looking on the second
17 page. Maybe you're looking at the page that's
18 labeled number 2, because I -- I don't see that.

19 Q Can I see your -- yeah, there you go.
20 Right underneath -- you see 1 and 2?

21 A Oh, yes. Okay, I'm with you.

22 Q Do you know why the government was
23 saying that no final conclusion should be drawn
24 from these samples?

25 A No, I -- I don't know why they would

1 **have said that.**

2 Q In other words, this would show that
3 they were releases into the creek in 1940 -- 1948
4 or prior, correct?

5 **A Correct.**

6 Q Do you know if the government continued
7 to do additional testing after this report that
8 you relied on?

9 **A I'm trying to think back through the --**
10 **the documentation. You know, they -- they say**
11 **here on this very same page that more samples**
12 **should be taken under different weather**
13 **conditions. I didn't see any evidence that that**
14 **was done.**

15 Q Do you know if they made any changes to
16 the site based on this testing or subsequent
17 testing of water samples?

18 **A Well, as -- as we talked about earlier,**
19 **I know that at some point in the history of the**
20 **site, they did install a sedimentation basin.**

21 Q I believe you told us earlier that this
22 particular report doesn't say one way or the other
23 how they tested the water or whether or not they
24 removed any type of sediment; is that correct?

25 **A I don't believe it does.**

1 Q Okay. You can set that aside.

2 MR. McCLAIN: Or the fact that it was
3 tested under unusual conditions. It does say
4 that.

5 I don't understand why they tried to
6 sample during a flood.

7 BY MR. ZAGER:

8 Q All right. Let's go down to the bottom
9 of page 13 of your report.

10 A Okay.

11 Q There you talk about some testing that
12 was done and some data that was collected after
13 the waste piles were removed, correct?

14 A At the bottom of page 13.

15 Q Where -- where you reference your
16 Table 1.

17 A I -- I know I talk about some samples
18 that were taken after the waste piles were
19 removed, but I don't see it on page 13.

20 Oh, at the very bottom. Yeah.

21 Q It says: "Thus, in my opinion, the data
22 included on Table 1 is reasonably representative
23 of water concentrations from both sides that
24 prevailed after the waste piles were removed but
25 before the FUSRAP remedial actions had been

1 complete."

2 Did I read that correctly?

3 **A Yes. Thank you.**

4 Q Then in Table 1, just generally explain
5 to me what it is you included in that table.

6 **A Table 1 provides a summary of the**
7 **effluent limitations as published in Section 20 of**
8 **10 CFR. And it does some unit conversions.**

9 **And then on the right-hand side, that's**
10 **a tabulation of the -- some of the sampling data**
11 **that I was able to find that had been collected**
12 **after the waste piles had been removed.**

13 Q Okay. So in the middle three columns,
14 we have effluent limitations for water. The one
15 on the far right-hand side is picocuries per --

16 **A Liter.**

17 Q -- liter. Oops, liter.

18 Then to the right of that, you have
19 actual measurement data?

20 **A Correct.**

21 **And then the -- the letter footnotes**
22 **under the column "Source," that's where I tried to**
23 **show where that measured data came from.**

24 Q Is it fair to say that Table 1 then
25 would be showing the average annual concentrations

1 of material that was running offsite after 1966
2 when the site -- when the material was removed
3 from SLAPS?

4 MR. MCGAHREN: Objection. Form.

5 THE WITNESS: I don't want to go so far
6 as to say that it's representative of an average.
7 I just don't think we have enough information
8 about that. I -- I used the term "reasonably
9 representative."

10 And I'm not trying to be wishy-washy,
11 but what we're trying to do here is reconstruct an
12 environment that frankly wasn't very well
13 documented. So I'm going to stick with that
14 terminology that it's "reasonably representative."
15 I don't want to give a sense that there's some
16 kind of statistical precision that I'm offering
17 up.

18 BY MR. ZAGER:

19 Q Okay. But it is the average of the data
20 that you have for each annual period. Fair?

21 A No, these -- these are discrete
22 monitoring results.

23 Q Okay. So these are individual
24 measurements that you're then just comparing to
25 the 10 CFR release limit?

1 **A That's right. And I will say that in**
2 **some of these reports, there were multiple samples**
3 **that were reported, and in those cases, I actually**
4 **reported the maximum concentration that -- that**
5 **was tabulated.**

6 Q Okay. So after the -- the waste was
7 removed in approximately 1966, I think we're in
8 agreement that Mallinckrodt was no longer
9 operating the site at that time, correct?

10 **A That's my understanding is that they**
11 **stopped operating in about 1966.**

12 Q And Table 1 shows that after that point
13 in time when Mallinckrodt was no longer operating
14 the site, there was still some release of
15 material from -- to the extent these apply to
16 SLAPS, there was release of material from SLAPS.

17 **A The -- the answer is yes.**

18 Q And I believe what you told us was for
19 the period of time when the waste materials were
20 still being warehoused at SLAPS, we just don't
21 have enough data to be able to calculate any type
22 of a annual average or release for purposes of
23 comparing that to the 10 CFR water effluent
24 limitations, fair?

25 **A That's not exactly the way I would put**

1 **it.**

2 Q Okay. Go ahead and put it in your own
3 words.

4 **A Okay.**

5 Q I believe we talked about this -- this
6 earlier. I thought that's what you said before,
7 but certainly explain it in your own words.

8 **A Okay. Well, I just want to make a**
9 **couple points, and that is that the effluent**
10 **limitations in Section 20, 10 CFR, they're not**
11 **average annual concentrations. So those are --**
12 **those are just discrete, you know, concentration**
13 **limitations or activity limitations.**

14 I didn't try to reconstruct any kind of
15 annual concentration timeline. There's a little
16 bit of data from the SLAPS site from the period in
17 which the waste piles were present. That little
18 bit of data does not indicate an exceedance. So
19 my -- I'm not sure exactly what my language is in
20 here, but my language is that I don't have
21 evidence that there were exceedances of these
22 water limitations during that period of time.

23 Q Okay. Let's step back. I want to ask
24 you something about 20.106. Is it your
25 understanding that Appendix B that has the

1 effluent limitations for water and air, that that
2 is not supposed to be an annual average release
3 rate; that you could actually violate 20.106 by
4 just a single test that exceeds the release limit?

5 **A That's my understanding.**

6 Q All right. Let's take a look at
7 page 14, your section on radon releases from
8 SLAPS.

9 You have some measurement data there in
10 the first paragraph; is that correct?

11 **A That's correct.**

12 Q Looking at your footnote, it appears
13 that all of the radon measurement data would have
14 been from 1948, correct?

15 **A I'm -- I'm just pausing because that --**
16 **that's what I'm citing here. I can't say sitting**
17 **here whether there are other radon measurements at**
18 **different times, because certainly there would**
19 **have been.**

20 Q But if we look at that paragraph titled
21 "Radon Releases from SLAPS," you cite two
22 footnotes, 34 and 35; is that correct?

23 **A That is correct.**

24 Q Okay. And then the first items that are
25 listed there are -- were the 1948 AEC radon

1 samples taken in the airport area; is that
2 correct?

3 **A Correct.**

4 Q We've already talked about how
5 Mallinckrodt's contract for SLAPS started in
6 July 20th, 1953. Obviously, the 1948 testing
7 preceded that, correct?

8 **A Correct.**

9 Q Other than the 1948 testing data, do you
10 have any other testing data or measurements for
11 radon releases from SLAPS?

12 **A So that's not something that -- that I**
13 **was asked to do. There are additional radon**
14 **measurements. I haven't tabulated them. It's --**
15 **that's not part of my opinion here.**

16 **You know, my original mandate was to**
17 **evaluate the available data and -- and compare**
18 **that against the 10 CFR Section 20 effluent**
19 **limitations. So I -- it just isn't something**
20 **that's part of this report.**

21 Q Okay. As far as this report, Exhibit 2,
22 is concerned, then the only radon measurement data
23 that you have for SLAPS is the 1948 report?

24 **A That's the only data that I'm relying on**
25 **for this opinion that the effluent limitation was**

1 **exceeded.**

2 Q Okay. So then the effluent limitation
3 would have been exceeded in 1948, correct?

4 **A Correct.**

5 Q Can you identify any year after 1948 for
6 which there would have been an effluent limitation
7 exceeded for radon at SLAPS?

8 **A Well, it's my opinion that as long as**
9 **the waste material remained on the site, these**
10 **measurements would have been representative of the**
11 **sorts of radon emissions that were occurring**
12 **across that entire time.**

13 Q Okay. We'll get to that, but let me
14 back up first to -- let's talk first about
15 measurements.

16 Do you have any measurement data after
17 1948 for radon releases from SLAPS?

18 **A Well, once again, I -- it wasn't, you**
19 **know, within my scope of work to compile that --**
20 **that data, so it's not cited in this report.**

21 Q Okay. I appreciate that. I think
22 that's -- that's a fair response. You only do
23 what you're asked to do.

24 But, nonetheless, given that you've
25 looked at the material, there's this opinion in

1 here.

2 **A Yes.**

3 Q I just want to know is there any other
4 testing data that I need to be talking to you
5 about, after 1948?

6 **A You know, there is additional testing**
7 **data that I'm aware of. We could pull it out and**
8 **talk about it, but this is the basis for this, you**
9 **know, fairly constrained opinion.**

10 Q Okay. The basis for this fairly
11 constrained opinion is the 1948 testing.

12 **A And my opinion that that's**
13 **representative of the kinds of radon emissions**
14 **that would have continued as long as the waste**
15 **piles were there.**

16 Q What radionuclides at SLAPS were capable
17 of producing radon? And specifically, we're
18 talking about radon-222, correct?

19 **A We are.**

20 **Well, it's -- you know, radium-226 is**
21 **the radionuclide that forms radon-222.**

22 Q Do you know what material -- and again,
23 we've talked about how the material out there was
24 classified using largely alphanumeric
25 designations.

1 What material by alphanumeric
2 designation had radium-226 in it?

3 **A You know, I don't have the precise**
4 **concentrations or activity levels in my head, but**
5 **all the materials contained some degree of**
6 **radium-226 and -- and its parent product**
7 **thorium-230.**

8 Q Okay.

9 **A They did have different -- different**
10 **mixes.**

11 Q With respect to your position that
12 the -- the wastes were, I believe you state,
13 "broadly representative" -- strike that.

14 With respect to your position that the
15 1948 testing or measurements are broadly
16 representative of emissions from SLAPS up
17 through 1966, did you perform any type of
18 calculations based on the individual makeup of the
19 material?

20 **A No, I didn't. This is -- this is one**
21 **part of my report where I was relying on**
22 **measurements and not on calculations.**

23 Q Okay. You write in your report on
24 page 14: "Although material progressively
25 removed" -- strike that.

1 "Although material was progressively
2 removed from the site starting in the 1950s, a
3 large volume of waste remained at SLAPS until it
4 was transferred to HISS in 1966."

5 Did I read that correctly?

6 **A Yes.**

7 Q Are you aware of any material that was
8 removed from SLAPS from the time of the 1948
9 testing that you reference in your report up until
10 July 20th, 1953, that would have reduced radon
11 emissions from SLAPS?

12 **A Well, I don't -- I don't remember the**
13 **exact date, but, you know, one of the emission**
14 **sources was the drummed waste that was called the**
15 **K-65 waste. And I am aware that -- that some or**
16 **all of that waste was removed back to the downtown**
17 **site, and then apparently the -- the drums were**
18 **returned back to SLAPS.**

19 Q Where did the actually K -- where did
20 the actual K-65 material go?

21 **A I don't know.**

22 Q Do you know what the radionuclide
23 content was of the K-65 material?

24 **A I mean, I -- I broadly know that it**
25 **was -- it was very high, relatively speaking, in**

1 **radium-226 and some other radionuclides.**

2 Q So to put this in perspective, the K-65
3 was heavily -- or had a high content of
4 radium-226, correct?

5 **A Right.**

6 Q The direct daughter product in the decay
7 series from radium-226 is radon-222, correct?

8 **A Correct.**

9 Q You said that you understand that the
10 K-65 material was moved to the downtown site at
11 some point, and then you don't know where it went,
12 correct?

13 **A Right.**

14 Q The removal of the K-65 from SLAPS would
15 have reduced the production of radon at SLAPS,
16 correct?

17 **A It would have reduced the production of**
18 **radon at SLAPS. It wouldn't necessarily have**
19 **reduced the concentrations in air at the fence**
20 **line.**

21 Q Why is that?

22 **A Well, because all the other waste**
23 **materials were -- were still there, and this -- I**
24 **mean, sure, there would be some possibly**
25 **unmeasurable change, but the other waste**

1 materials, which occupied a much larger area and
2 also were uncontained, also were producing
3 radon-222.

4 Q But you can't quantity the amount of
5 radon-222 being produced by the non-K-65
6 materials, fair?

7 A I can't -- I can't specify precisely
8 what the difference would be.

9 (Exhibit No. 8 was marked for
10 identification.)

11 BY MR. ZAGER:

12 Q I'm going to hand you what I marked as
13 Exhibit 8.

14 Take a look at Exhibit 8 and tell me if
15 you recognize that document.

16 A I do recognize this document. This is a
17 1948 document about radon samples at the airport
18 site.

19 Q Okay. But this is the actual testing
20 information that you relied on with respect to
21 your opinion that there were exceedances of the
22 federal regulatory limit for radon at SLAPS,
23 correct?

24 A That is correct.

25 Q Okay. Let's take a look at the second

1 page of the document, which is actually the -- the
2 letter. Do you see that?

3 **A Yes, I do.**

4 Q Okay. This is on letterhead from the
5 United States government, correct?

6 **A Correct.**

7 Q The first full paragraph there says: "A
8 survey was made at the airport area in order to
9 determine the concentration of radon in the air,
10 the source of this contamination being the K-65 in
11 and around the storage shed."

12 Did I read that correctly?

13 **A Yes.**

14 Q Okay. Let's go then to, I guess it
15 would be, the third page of Exhibit 8.

16 That's a table that lists their
17 readings, correct?

18 **A Let's see. Yes, it is.**

19 Q Okay. These are the -- this is the data
20 that you cite in your report, correct?

21 **A It -- the value of 210 picocuries per**
22 **liter is -- is cited here, yeah. That's the**
23 **source.**

24 Q And so if we look up above, we see that
25 they took measurements at passageway number 1

1 shed, passageway number 2 shed, passageway
2 number 3 shed; is that correct?

3 **A Correct.**

4 Q The percent of tolerance for those
5 measurements was very high, including one of them
6 that was 2,380 percent or times the tolerance.

7 **A Correct.**

8 Q Those are in the shed area. Fair?

9 **A That's fair.**

10 Q All right. Is it your understanding
11 that the K-65 was actually stored in the shed?

12 **A That's my understanding, it was stored**
13 **in or maybe around a shed.**

14 Q Okay.

15 **A Yeah.**

16 Q Then the -- the number that you cite in
17 your report for the 210 percent of tolerance says
18 200 feet north of passageway number 2. Is that
19 correct?

20 **A Right.**

21 Q Do you know where that was located
22 actually on the property?

23 **A You know, I can't -- I can't think of**
24 **exactly which report further cites this data**
25 **because I don't think -- oh, yeah, this does have**

1 **a little map. So we can see this on the map.**

2 **This is sample R -- 10-R51. And R51 is shown here**
3 **on sort of the north side of the site.**

4 **(Counsel conferring.)**

5 BY MR. ZAGER:

6 Q Doctor, I'm going to hand you a
7 highlighter. Could you just mark where you
8 believe that sample was collected from on the map
9 that's contained in Exhibit 8.

10 **A Yeah, let me just make sure I gave you**
11 **the right number.**

12 MR. SODEN: I'm not sure they'll want
13 colored. You'd probably better use a pen.

14 THE WITNESS: (Witness complies.) Okay.

15 BY MR. ZAGER:

16 Q Can I see -- can I see what you marked?

17 **A Yeah.**

18 Q Okay. So according to the description,
19 then that would be approximately 200 feet away
20 from the sheds where the K-65 was stored, correct?

21 **A I think that's about right.**

22 Q Okay.

23 (Exhibit No. 9 was marked for
24 identification.)

25 BY MR. ZAGER:

1 Q Next I'm going to hand you what I marked
2 as Exhibit 9.

3 Have you ever seen this document?

4 **A I'm not sure. Can you tell me what this**
5 **table is from? It seems to be an excerpt from a**
6 **report.**

7 Q I don't recall.

8 **A I don't -- you know, there are a lot of**
9 **big voluminous documents, so I don't want to say**
10 **I've never seen this, but I -- it doesn't look**
11 **familiar to me.**

12 Q Okay. If you look at the second line
13 down in the table, it says: "K-60" -- "K-65
14 Radium-bearing residue."

15 Did I read that correctly?

16 **A Right.**

17 Q Okay. And then if we go over and you
18 look at -- I guess at the top, it's got, you know,
19 "April 1959," "June 1960," "November 1965."

20 The tonnage for each of those years for
21 the K-65 radium-bearing residue is zero across the
22 board, correct?

23 **A That's what it says, yes.**

24 Q Okay. Then if we look over to the right
25 column, it says "Disposition," correct?

1 **A Right.**

2 Q Then if you go down to radium -- I'm
3 sorry, the K-65 radium-bearing residue, it says
4 '48 and '49, and then number 7, which corresponds
5 at the bottom to Lake Ontario, New York storage
6 site.

7 Is that correct?

8 **A That's what it says.**

9 Q Okay. Do you have any reason to
10 disagree that the K-65 that was stored at SLAPS
11 was removed to the Lake Ontario, New York storage
12 site in 1948 and 1949?

13 A Well, once again, I -- I testified
14 earlier I didn't know its ultimate disposition.
15 But, yeah, I -- I do agree that the record shows
16 that this material -- which, by the way, was
17 stored in drums, closed drums -- was removed from
18 the SLAPS site.

19 Q Closed drums or disintegrating drums?

20 A Well, that's a good point. Yeah, they
21 were reported as -- as being damaged.

22 Q Okay. Given that we have testing from
23 1948 that states that they are looking at the
24 radon being produced by the K-65, and we know --
25 or this document tells us that the K-65 material

1 was moved offsite in 1948 and '49, would you agree
2 with me that that testing data in 1948 is not
3 representative of what would have occurred in '50
4 through '66?

5 **A** **I don't completely agree with that, no.**
6 **I mean, certainly in 1948, the report we're**
7 **talking about, there were radon samples that**
8 **were -- or analyses that were taken right in the**
9 **shed and, you know, right around the drums.**
10 **Clearly that's indicative of emissions from the**
11 **K-65 material.**

12 **But this -- this sample that I'm talking**
13 **about was on the property line, and so there would**
14 **have been, you know, turbulent flow and a mixture**
15 **of radon from all the sources on the site.**

16 **Q** **Okay. What was the prevailing wind**
17 **direction at SLAPS?**

18 **A** **I don't know the prevailing wind**
19 **direction.**

20 **Q** **Do you know what portion of the**
21 **radium-226 material that was on site -- strike**
22 **that.**

23 **Can you state to me to a reasonable**
24 **degree of scientific certainty the amount of any**
25 **radon-222 release from SLAPS for the period of**

1 time, say, from 1950 up to 1966?

2 **A** Well, just as for the -- our discussion
3 of water, I don't believe that we have enough
4 information to reconstruct something like an
5 annual flux.

6 But I stick by my contention that this
7 measurement made at the fence line or near the
8 fence line in 1948 is indicative -- I use the term
9 "broadly representative" -- of emissions
10 through 1966 when the remainder of the waste was
11 removed.

12 Q Even though you don't know what portion
13 of the remaining material contained radium-226?

14 **A** Well, it all contained radium-226.

15 Q You don't know the percentage of the --
16 of the material on site after the K-65 left, you
17 don't know what percentage of that was radium-226?

18 **A** We can easily look that up. I mean,
19 that -- that kind of information is known, but
20 I -- as we sit here now, no, I don't.

21 Q And you didn't put that in your report,
22 fair?

23 **A** There's a little bit of -- of that
24 because we talk a little bit about the mean
25 concentrations in some of the residues, but I

1 **don't talk about the K-65.**

2 Q You relied on certain information from
3 the RAC report, but you did not rely on their
4 calculation of radon flux at years after 1948.
5 Correct?

6 A **Yeah, that's -- that's correct, because**
7 **what they came up with was a flux, as I recall,**
8 **and I was really -- because of my assignment, I**
9 **was really looking for an activity concentration.**

10 Q Just to be clear then, is it your
11 opinion -- are you -- do you intend to offer the
12 opinion that from 1950 to 1966 that -- that there
13 were exceedances of the 10 CFR 20.160(a)
14 limitation on releases of radon-222?

15 A **At the SLAPS site?**

16 Q Yeah.

17 A **If asked, I would -- I would say, yes,**
18 **that is my opinion.**

19 Q The basis for that is the 1948 testing
20 and your belief that there was other radium-226
21 material on site.

22 A **That's correct.**

23 Q Could you take RAC's flux calculations
24 and calculate out the activity concentration so
25 that you could compare that to the 20.106

1 standard?

2 **A** One -- yeah, one could probably do that.
3 Yeah, I -- I -- I did not do that. I would need
4 to take a closer look at their calculation, which
5 I didn't study in detail, for SLAPS. But it's my
6 expectation that one could do that. There would
7 be a degree of uncertainty, as I talk about in my
8 report and we've talked about here, but I think
9 that could probably be done.

10 **Q** Okay. Let's go ahead and take a look at
11 page 15 of your report. There you have a section
12 entitled "Air Releases from SLAPS."

13 And on there and on the next page, you
14 have some tables and information that you pulled
15 together. Why don't you just go ahead and
16 generally explain to me how it is that you went
17 about calculating or evaluating air releases from
18 SLAPS for these opinions.

19 **A** Okay. That's a fair question.

20 This analysis is based on a measurement
21 of total uranium in air taken in 1960. And in so
22 many words, what I do in this report is show how
23 from that measurement it's possible to develop
24 reasonable estimates of the effluent
25 concentrations of other radionuclides at the

1 **fence line.**

2 Q Okay. So on page 15, you have a -- a
3 chart there, and if I understand correctly, you
4 took two tables from RAC's 2018 report and
5 combined them into one. Fair?

6 A That's -- yeah, that's basically
7 correct. There's -- there's nothing in this table
8 that I calculated myself. This is just a kind of
9 a reference table showing the weighted average
10 activities of the different radionuclides.

11 Q Is it fair to say that -- to kind of sum
12 up this table, what you have here is, if we had a
13 pie chart, you're figuring out -- well, strike
14 that.

15 If we had a pie chart, what RAC did was
16 kind of figure out what slices of -- of the total
17 pie would be individual radionuclides?

18 A It's actually kind of the other way
19 around. We had information on the -- on the
20 composition of these different wastes, which were
21 stored more or less separately.

22 And what RAC has done here is they've
23 taken that information, along with information
24 about the amount, about how much of each of these
25 things there was at the site, and they've

1 **calculated, in essence, an average across all the**
2 **wastes.**

3 Q Okay. So let's go to page 16 of your
4 report. Then you -- you take some total uranium
5 measurement data from the 1960 annual testing
6 report; is that correct?

7 **A Correct.**

8 Q Okay. You write: "Four samples were
9 collected near the SLAPS property line, and the
10 highest concentration of uranium detected reported
11 as 4.5 times 10 to the negative 14" -- that would
12 be microcuries?

13 **A It is. It's -- it's a funny unit,**
14 **microcuries per cubic centimeter.**

15 Q Okay. So there -- there was sampling
16 data, and you took the highest measurement that
17 they had in that data, and then you performed some
18 calculations based on that, correct?

19 **A That's right.**

20 Q Earlier I think you told us that under
21 10 CFR 20.106(a), and specifically Appendix B that
22 has the effluent limitations, that it's your
23 belief that those limitations apply to the maximum
24 release, correct?

25 **A Well, they apply to any release.**

1 **They're -- they're not meant to be some kind of**
2 **annual average. I think before we were talking**
3 **about an annual average --**

4 Q Correct.

5 **A -- and it's my -- it's my belief that**
6 **that's not what they're referring to.**

7 Q Maybe I was clumsy.

8 So when you apply the limits that are
9 stated in 20.106, Appendix B, if you have a
10 maximum concentration measurement that exceeds
11 that, then that's a violation in your opinion.
12 It's not an average.

13 **A That's correct.**

14 Q Okay. So based on that understanding,
15 you took -- from these four samples that you
16 report collected in the 1960 offsite testing, you
17 took the highest measurement, and then you figured
18 out what the activity would be from the various
19 nuclides that make up that measurement.

20 **A Yeah, that's what I did.**

21 Q Okay. It specifically looks like you
22 looked at uranium-238, uranium-235 -- strike that.
23 That's not right.

24 The total U is made up of the three
25 types of uranium, correct?

1 A That's right. It's kind of a two-step
2 process. So the first thing I did was estimate
3 the -- kind of the speciation of the uranium
4 species.

5 Q Okay. So you take this 4.5 times 10 to
6 the negative 14. Walk me through what you do from
7 there so I can understand it.

8 A So the table that's listed on page 16 --

9 Q Mm-hmm.

10 A -- that's the first step of this process
11 where we speciate across the three dominant
12 uranium isotopes. And really all I did here is
13 I -- I made an assumption that the uranium in the
14 waste on this site is present in its natural
15 isotopic abundances. So that's what's shown on, I
16 guess that would be, the second column. That's
17 just out of the literature. I think you could
18 look at Dr. Till's report and find the very same
19 numbers in there.

20 Q That's the specific activity?

21 A No, it's not the specific activity.
22 It's the mass fraction in nature.

23 Q Okay. Okay.

24 A So if you just crack open a rock, this
25 is -- this is how the uranium species would

1 **differentiate.**

2 Q Okay.

3 A Then I did use the specific activity of
4 each of those isotopes to create an activity
5 ratio. So this total uranium measurement was in
6 units of activity. The activity ratio is what
7 allows me to kind of allocate that total amount,
8 the 4.5 times 10 to the minus 14, across these
9 three uranium isotopes.

10 Q Okay.

11 A So that's an assumption that I think is
12 reasonable that the uranium on the site is present
13 in approximately its natural isotopic abundance.

14 Q Okay. And then -- so you said it was
15 two steps. So that sounds like step 1.

16 And then you are going to start breaking
17 it out into individual radionuclides, which I
18 think takes us to Table 2, correct, at the back of
19 your report?

20 A Ones that are other than uranium.

21 Q Right.

22 A Yeah. Yeah, that's correct.

23 Q Okay. So explain Table 2, "Effluent in
24 Air for SLAPS," to me.

25 A Isn't it obvious? I know I'm not

1 supposed to tell jokes.

2 So you recall we were talking about the
3 table that I included on page 15 that provides the
4 weighted average of the activities of the
5 important radionuclides in all the wastes that
6 were present at the site.

7 So this is -- this is kind of the key
8 here. What I -- once I had an estimate of the
9 activity of uranium-238 that I was able to derive
10 from that measurement that was actually total
11 uranium, so it had to be corrected for
12 uranium-238, then the activity of all the other
13 radionuclides is a constant ratio with respect to
14 uranium-238.

15 So I could basically calculate -- as an
16 example, you'll see the very first line -- well,
17 let's do the second line, thorium-230. If you
18 scroll across to the column that is labeled "As a
19 percent of U-238." If we look at the weighted
20 activity fractions of the materials from the SLAPS
21 site, you can do the simple math that the activity
22 of thorium-230 is 1,013 percent of the activity of
23 uranium-238.

24 Q Okay.

25 A And then there's one last thing, not to

1 **belabor the point. There's an assumption here**
2 **that's typically made for studies of dust and**
3 **contaminants in air, that the contaminants in**
4 **those airborne particulates are present in the**
5 **same abundances and ratios as the source. Because**
6 **the -- that weighted activity information is about**
7 **the waste piles.**

8 Q Okay. So the result then is, if we go
9 to Table 2, the far right column labeled
10 "Picocuries perimeter cubed," that tells you the
11 amount of that radionuclide in the measurement
12 that was taken back in 1960, correct?

13 A **To -- yeah, to a degree of reasonable,**
14 **you know, scientific certainty, that's my opinion.**

15 Q And to be clear, that's -- that starts
16 with that maximum measurement of 4.5 times 10 to
17 the negative 14?

18 A **That was the maximum measurement for**
19 **that reporting period.**

20 Q Okay. So then we compare the right
21 column, "Picocuries to the meter cubed," to the
22 far right column in -- in the second grouping,
23 "Effluent Limitations for Air," correct?

24 A **That's correct.**

25 Q All right. That one in parentheses,

1 "Picocuries to the meter cubed," that is the
2 limit -- the effluent limit in air from 10 CFR
3 20.106(a), Appendix B. Fair?

4 **A Yeah, that's right. Those three columns**
5 **aren't really new data. I'm just converting to**
6 **consistent units.**

7 Q Okay. So the reason why you have the
8 "thorium-230 soluble" highlighted is because,
9 based on this process that you just did, it's your
10 opinion that the thorium-230 release exceeded the
11 limit for soluble 230, fair?

12 **A Correct.**

13 Q Okay. If we look at the rest of these
14 radionuclides, because they're not shaded, they
15 did not exceed the 10 CFR 20.106 effluent
16 limitation, fair?

17 **A That was my finding for this particular**
18 **dataset.**

19 Q Okay.
20 (Exhibit No. 10 was marked for
21 identification.)

22 BY MR. ZAGER:

23 Q I'm going to hand you what I marked as
24 Exhibit 10.

25 What is Exhibit 10?

1 **A Exhibit 10 is titled "Environmental**
2 **Monitoring Report Part 2, Year 1960" from**
3 **Mallinckrodt.**

4 Q Okay. This is the testing data that you
5 relied on for the calculations that we just
6 discussed and that are memorialized in Table 2 of
7 your report, correct?

8 **A That's correct.**

9 Q Okay. If you go down to the -- the
10 Bates-labeled page MLCT_TParty 515.

11 **A 515.**

12 Q Right.

13 **A Okay.**

14 Q That was the actual data -- the --
15 strike that.

16 On Bates label page 515, that contains
17 the actual data that you used, correct?

18 **A That's correct.**

19 Q Okay. We talked earlier about some
20 water testing data. That's actually reported
21 right above for the airport site, correct?

22 **A Yes, it is.**

23 Q Okay. If we look at this Bates label
24 page 515, we see that 4.5 high concentration
25 measurement, but they also provided the average,

1 correct?

2 **A They do.**

3 Q All right. It looks like the average is
4 about 65 percent less?

5 **A The average is 1.6 for that particular**
6 **site, north of site, and I think they mention here**
7 **that they collected six samples.**

8 Q Okay. As opposed to the four.

9 You did not use the average measurement
10 in your calculations that we just talked about,
11 fair?

12 **A That's right, I didn't.**

13 **(Exhibit No. 11 was marked for**
14 **identification.)**

15 BY MR. ZAGER:

16 Q All right. Let me hand you next what I
17 have marked as Exhibit 11.

18 We have been talking a lot about 10 CFR
19 20.106. That's contained in Exhibit 11; is that
20 correct?

21 **A Let's see. It does appear to be, yeah.**

22 Q Okay. Is -- let's go ahead and go to, I
23 guess, page -- there's actually page numbers up --

24 **A Okay.**

25 Q -- on some of the right corners. Go to

1 8599.

2 **A Okay. All right.**

3 Q This contains the specific page that
4 we've been talking about, which is section --
5 or this page contains the specific section we've
6 been talking about extensively, which is
7 Section 20.106, correct?

8 **A That's correct.**

9 Q Okay. If you go down, you see (a)
10 there, and if you go down to the bottom, it says:
11 "For purposes of this paragraph, concentrations
12 may be averaged over periods not greater than one
13 year."

14 Did I read that correctly?

15 **A Yes.**

16 Q Okay. I believe we've talked about it
17 now extensively, you did not use averages when you
18 were calculating out whether or not there was an
19 alleged exceedance of thorium-230 soluble. Is
20 that fair?

21 **A That's correct.**

22 Q Is there any reason why you did not use
23 the average based on what's stated there in the
24 standard?

25 **A Well, first of all, that -- that**

1 **standard says that averages over a year may be**
2 **used. It doesn't say it must be used. I didn't**
3 **think that we had enough information -- we talked**
4 **a little bit earlier at the very beginning of the**
5 **day about using averages and 95 percent, you know,**
6 **UCLs.**

7 **In -- in general, if you're going to try**
8 **to use an average concentration, there has to be a**
9 **robust enough body of data to provide a reliable**
10 **estimate of the average, and I just -- it's my**
11 **opinion that we just don't have that for these**
12 **time periods and for these media.**

13 Q So there -- there were six measurements
14 for that particular location as opposed to the
15 four that you reported, correct?

16 A Well, the -- the reference to four
17 locations has to do with the --

18 Q Right.

19 A -- four different locations, not the
20 number of measurements at each location.

21 Q Okay. Fair enough.

22 But for the measurement location that
23 you used 4.5, which was the maximum measurement,
24 there were actually a total of six measurements
25 done at that point, correct?

1 **A That's the way I interpret that table,**
2 **yeah.**

3 Q Okay. Does 20.106 state a certain
4 number of measurements that you have to have in
5 order to be able to average it under the standard?

6 **A No, I don't believe it does. And I -- I**
7 **think the way I would answer that is, if an**
8 **average can be reliably calculated, it's**
9 **permissible, but it's not required.**

10 Q Okay. But who gets decide -- to decide
11 whether or not to use the average as opposed to
12 the one-time measurement maximum?

13 **A Well, I mean that's kind of an interplay**
14 **between the license holder and -- and the**
15 **regulator. And in my case, for this purpose of**
16 **trying to reconstruct some information from after**
17 **the fact, I made that call.**

18 Q Okay. Are you aware of the Atomic
19 Energy Commission ever stating that six
20 measurements was not sufficient to use for an
21 average?

22 **A I don't -- I'm not aware that they speak**
23 **to that.**

24 Q Okay. And again, in the report provided
25 by Mallinckrodt for its 1960, they actually did

1 provide an average, though, correct? And there's
2 a column for it and there's a number in there.

3 **A Yeah, I -- I'll submit to you that it's**
4 **a little unclear what those -- what those values**
5 **need -- mean. But that would be my interpretation**
6 **that that's the average across the six samples**
7 **that were collected.**

8 **But, you know, the text of -- well,**
9 **there really isn't any text to this report. It**
10 **doesn't specifically say that's what that is, but**
11 **it does -- it is described or labeled on the**
12 **column as average.**

13 **Q Okay. If there were a total of six**
14 **tests and 4.5 was the highest, then that would**
15 **mean the other five tests were all lower than 4.5,**
16 **correct?**

17 **A Yes.**

18 **Q All right. The other thing that you do**
19 **in your opinion that there was an exceedance of**
20 **the thorium-230 effluent limitation is you used**
21 **the measurement for soluble, correct -- or the**
22 **limit for soluble, correct?**

23 **A Correct.**

24 **Q What is the limit for insoluble? Is it**
25 **more or less than the soluble limit?**

1 **A It tends to be more than the soluble**
2 **limit.**

3 Q Is that for every radionuclide?

4 **A I -- I haven't looked through the entire**
5 **table, but -- but it certainly is a -- seems to be**
6 **the pattern.**

7 Q I should have probably had it while you
8 were there, but if -- well, let's go ahead and go
9 Appendix B of 20.106.

10 **A Okay. I'm with you.**

11 Q Okay. So the -- the standard that you
12 used or the -- the limit that you used for soluble
13 thorium-230, according to Table 2, column 1, which
14 is the air for unrestricted sites, is -- is it 8
15 times 10 to the negative 14?

16 **A I'm sorry, which --**

17 Q Well, I'll tell you what --

18 **A -- compound are we looking at?**

19 Q What was the limitation that you used
20 for soluble thorium-230?

21 **A The limitation I used was 8 times 10 to**
22 **the minus 14 microcuries per milliliter.**

23 Q Then the effluent limitation for
24 insoluble thorium-230 is 3 times 10 to the
25 negative 13 microcuries per milliliter, correct?

1 **A Boy, I'm not trying to be difficult, but**
2 **I -- I can't read that.**

3 Q Okay. Well, I want you to assume that
4 the limit for soluble -- strike that.

5 I want you to assume that the limit in
6 1960 for insoluble thorium-230 was 3 times 10 to
7 the negative 13 microcuries per milliliter. Okay?

8 **A 3 times 10 to the minus 13.**

9 Q Yeah. And if you want a piece of paper
10 or anything like that to -- to write that down or
11 anything, we can certainly do that.

12 **A Okay.**

13 Q Between the soluble limit and the
14 insoluble limit that I just provided you, which
15 would allow a larger release of material?

16 **A The insoluble effluent limitation would**
17 **allow a larger release of material.**

18 Q Okay. In fact, it would allow a larger
19 release of material by an order of magnitude,
20 correct?

21 **A Approximately an order of magnitude,**
22 **yes.**

23 Q Okay. In your report, though, you use
24 the soluble thorium-230. Why did you use that --
25 that limit as opposed to the insoluble limit that

1 allowed more release?

2 **A** Well, there were a couple of reasons I
3 did that. I did look into that, and I wanted to
4 be sure that I was using the right value. And I
5 talk about that in the report that -- let's see.
6 (Peruses document.)

7 **Q** If it helps you, I think you are
8 probably looking for page 12.

9 **A** That's right.
10 There's a 1979 survey that was done by
11 DOE where they referred to the soluble effluent
12 limits as a comparative guide. And then I also --
13 I also applied, you know, kind of a precautionary
14 principle, that we -- we didn't really have
15 detailed quantitative information about whether
16 these materials were best classified as soluble or
17 insoluble. So in order to be conservative, more
18 protective of human health and the environment, I
19 made an assumption that they should be classified
20 as soluble.

21 **Q** Okay. We can agree, though, that the
22 issue in this case -- this isn't a cleanup case,
23 correct?

24 **A** That's correct.

25 **Q** The FUSRAP program has already done

1 remediation out there, correct?

2 **A I mean, they have done remediation. You**
3 **know, I haven't made any kind of --**

4 Q Okay.

5 **A -- efforts to evaluate the completeness**
6 **of it, but I get that.**

7 Q I understand that.

8 But, nevertheless, what you're doing in
9 this case is a retrospective evaluation for
10 Mallinckrodt's activities back in the 1950s and
11 '60s to determine whether or not they violated the
12 federal regulations, correct?

13 MR. McCLAIN: Object to the form of the
14 question. That's not the standard.

15 THE WITNESS: Well, I -- I stand by the
16 way I describe my work in my report and these
17 opinions, but what I was looking at is
18 reconstructing effluent concentrations at or near
19 the fence lines.

20 BY MR. ZAGER:

21 Q Okay. Let's come at it from this angle
22 then. So you mentioned the DOE 1979 report.
23 We'll come back to that.

24 What chemical form was the thorium-230
25 in at SLAPS?

1 **A** You mean like what mineralogical form
2 was it in?

3 **Q** Yeah, what chemical -- chemical form
4 would it be in? Yep.

5 **A** Well, the chemical form is thorium-230.
6 In terms of what sort of mineralogical form it
7 is -- it was in, I don't know.

8 **Q** Okay. What mineralogical or chemical
9 forms of thorium-230 would be soluble?

10 **A** Well, so this is a different kind of
11 solubility that we're talking about. This is --
12 what we're really talking about here is whether or
13 not these materials remain in particulate form if
14 they get into your body and -- and are excreted
15 fairly rapidly, or whether or not some of that
16 material in a sense dissolves.

17 **Q** Right. But if we were to go to a book
18 on thorium-230, it would list out the different
19 chemical forms of it and talk about solubility.

20 I'm just -- which of those forms would
21 be soluble in water, for instance?

22 **A** Well, broadly, salts are more soluble in
23 water, and things like silicates are less soluble
24 in water.

25 **Q** Okay. But with respect to thorium-230,

1 I mean can you -- can you tell me any chemical
2 form of thorium-230 that is soluble in water?

3 A So this is just kind of a matter of
4 degree. I mean, all of these things are soluble
5 in water to -- to some degree, and the reason you
6 have a radium standard in drinking water is
7 because it's a little bit soluble, but soluble
8 enough that it can cause a problem. Same thing
9 with uranium.

10 So, frankly, all these things are, on
11 the grand scheme of things compared to something
12 like table salt, are pretty sparingly soluble.

13 Q Is there any chemical form of 230 that
14 is insoluble in water?

15 A Now, once again, no. There -- there's
16 always some degree of solubility from a mineral
17 into water that can be lesser or greater.

18 Q For instance, have you heard of thorium
19 dicarbonate?

20 A I've heard of it.

21 Q Is it soluble in water or not?

22 A Well, it -- it's a mineral that's -- I
23 would call it sparingly soluble. I mean, it's --
24 it's the kind of thing where if you were to crush
25 up that mineral and put it in water, yes, a little

1 bit of that compound would dissolve into water.

2 Q Okay. Thorium dioxide, is that soluble
3 in water?

4 A Once again, these -- thorium dioxide, I
5 don't know the exact solubility. We can easily
6 look it up. But these things are --

7 MR. McCLAIN: Well, then just take time
8 and look it up. Don't guess. This is not a --

9 THE WITNESS: Okay.

10 MR. McCLAIN: This is not a --

11 BY MR. ZAGER:

12 Q Maybe we can -- maybe we can cut it off
13 at the pass here a little bit. You don't know
14 what the chemical form was of the thorium-230 out
15 at the SLAPS site, fair?

16 A I don't know the mineralogical form.

17 Q Okay. With respect to its solubility of
18 whatever this unknown chemical form was of the
19 thorium-230 at the SLAPS site, you haven't done
20 any testing or analysis into that, have you?

21 A I haven't done any testing. I -- I made
22 an assumption that these materials are, while
23 sparingly soluble in water, they are capable of
24 dissolving in water. I'm not a physiologist.
25 I -- I don't want to talk about, you know, what

1 happens in the body, but things are even more

2 soluble in, you know, stomach acids.

3 Q Did you -- okay. When you talk about
4 solubility -- strike that.

5 When you talk with solubility under
6 these standards, we're talking about whether or
7 not it's soluble in the human body. Is that fair?

8 A I believe that's correct.

9 Q Okay. Did you look up any ICRP guidance
10 documents to see what they recommend as far as
11 whether to characterize thorium-230 that's in the
12 environment as soluble or insoluble?

13 A No, I didn't.

14 Q Do you know what a dose coefficient is?
15 I understand you don't do dose work, but you
16 understand what a dose coefficient is?

17 A I do, yeah, as a layperson.

18 Q Did you look up any ICRP guidance
19 documents on dose coefficients related to
20 thorium-230 to see how they characterize it to
21 let -- to let you know whether or not it should be
22 characterized as soluble or insoluble?

23 A No.

24 Q You mentioned the DOE report in 1979.
25 Did they do any type of chemical analysis to say,

1 yes, this thorium-230 was soluble as opposed to
2 insoluble?

3 **A I don't think so.**

4 Q Do you know what their basis was for
5 saying that it was -- or characterizing it as
6 soluble?

7 **A The --**

8 MR. MCGAHREN: Objection to form.

9 THE WITNESS: I don't know -- I don't
10 know the basis for their conclusion of that sort.

11 MR. ZAGER: Okay.

12 (Exhibit No. 12 was marked for
13 identification.)

14 BY MR. ZAGER:

15 Q I'm going to hand you what I marked as
16 Exhibit 12.

17 MR. MCGAHREN: This is 12?

18 MR. ZAGER: Yep.

19 BY MR. ZAGER:

20 Q Have you had a chance to take a look at
21 that real quickly?

22 **A (Peruses document.) Yes, I have.**

23 Q Okay. What is Exhibit 12?

24 **A So Exhibit 12 appears to be the -- a**
25 **copy of the 1979 radiological survey of the former**

1 **AEC St. Louis Airport Storage Site.**

2 Q Okay. With respect to your paragraph on
3 page 12 of your report where you talk about the
4 issue of solubility versus insolubility of the
5 thorium-230, in footnote 31 you cite "DOE 1979
6 Radiological Survey of the St. Louis Airport
7 Site." Is that correct?

8 **A That's correct.**

9 Q Specifically you cite Table 19, right?

10 **A Right.**

11 Q Okay. Is that Exhibit 12?

12 **A That's the report, yeah.**

13 Q Okay. Let's go ahead and turn to --
14 it's page 58, based on the page number at the top.

15 **A Okay.**

16 Q Okay. You refer to Table 19. Let's go
17 to page 60 of Exhibit 12.

18 **A Okay.**

19 Q Okay. And down below, the bottom line
20 on that table says: "10 CFR 20 guideline," and if
21 we go to thorium-230, they use the picocurie per
22 limit -- or picocurie per liter limit of 2,000; is
23 that correct?

24 **A That's right.**

25 Q Okay. And if you go back to, I guess it

1 would be, page 58, you see Table 17, correct?

2 **A Right.**

3 Q Okay. There the bottom line says:
4 "10 CFR guideline," and you go over and there's a
5 "thorium-230" column, correct?

6 **A Yes.**

7 Q Okay. And down at the bottom, that says
8 "80," and then they give an "S" for soluble,
9 correct?

10 **A Correct.**

11 Q All right. And if we look at some of
12 the -- strike that.

13 So then if you go down to the number B,
14 it says: "More restrictive guide is given.
15 Soluble" -- or "S equals soluble, I equals
16 insoluble." Correct?

17 **A Correct.**

18 Q Okay. So they're just using the most
19 conservative limit, correct?

20 **A That's correct, and that's -- that's
21 consistent with what I decided to do.**

22 Q Okay. Actually, let's go a little bit
23 -- go back in the document, Exhibit 12, to
24 page 17.

25 **A 17?**

1 Q Yep.

2 A Okay.

3 Q Down in the middle of the page, there's
4 a heading that says "Concentrations of Long-Lived
5 Radionuclides in Air." Is that correct?

6 A Correct.

7 Q Okay. And then if you go to the last
8 sentence in that paragraph, it says: "Also shown
9 in Table 17 are the more restrictive concentration
10 guides from 10 CFR, Appendix B, for airborne
11 radionuclides." Correct?

12 A Let's see. We're right in the middle of
13 the page.

14 Q Yeah, last -- last sentence.

15 A Yes.

16 Q Yep. Okay. So they didn't do any type
17 of testing of the thorium-230 out there, fair? At
18 least not for solubility.

19 A That -- that's right. They did testing
20 for -- for thorium-230 but not for solubility,
21 as -- as far as I can tell.

22 Q But their general principle there was
23 just for any of these radionuclides we're testing,
24 whether we use the limit for soluble or insoluble,
25 we're going to err on the side of caution and use

1 the most restrictive.

2 **A That's the way I -- I read this, and**
3 **that's -- that's consistent with the methodology I**
4 **used.**

5 Q Would you agree with me that based on
6 your calculations that we talked about and that
7 are memorialized in Table 2 of your report, if we
8 apply the standard for insoluble thorium-230,
9 there is not a violation, is there?

10 MR. McCLAIN: Object to the form of the
11 question, assumes facts not in evidence.

12 THE WITNESS: Well, I can't do the exact
13 math in my head, but the answer would be that
14 that's correct, that wouldn't be a violation.

15 I don't think that's the appropriate way
16 to do it, but if we were hypothetically to look at
17 only the insoluble limitations, then at least for
18 this set of calculations, there would not be.

19 BY MR. ZAGER:

20 Q Okay. I just want to make sure I'm
21 clear. For SLAPS with respect to Mallinckrodt,
22 the alleged exceedances of the radiation safety
23 regulations found in 10 CFR Part 20 that you've
24 identified are the radon-222 and the thorium-230;
25 is that correct?

1 **A That's correct.**

2 Q You didn't identify any other
3 exceedances of the limits in 20.106 with respect
4 to SLAPS, correct?

5 **A That's correct, although I will also say**
6 **I didn't analyze every bit of data. I haven't**
7 **been asked to do that, but there's -- there is --**
8 **as sparse as it is, there is other data, so I**
9 **haven't done an exhaustive analysis of that.**

10 Q Okay. And that's fine.

11 But as far as we sit here, based on your
12 two reports and -- with the date of
13 October 19th -- October 17th, 2019, the effluent
14 exceedances that you allege or you opine occurred
15 were the radon-222 and the thorium-230, correct?

16 **A Those are the quantitative effluent**
17 **limitations that I've identified.**

18 MR. ZAGER: All right. Let's --
19 let's -- I'll try to do this fairly quickly. Do
20 you want a break? Are you good? Do you want to
21 take a --

22 THE WITNESS: What time are we getting
23 to be?

24 MR. MCGAHREN: It's getting to be 3:00.

25 MR. ZAGER: It's 2:48.

1 THE WITNESS: I don't need a break right
2 now, but in the next 10 or 15 minutes maybe.

3 MR. ZAGER: There you go. Okay.

4 BY MR. ZAGER:

5 Q You have a section in your report called
6 "Notes on Allocation"; is that correct?

7 A Yes.

8 Q And it starts on page 19 of your report?

9 A Yes.

10 Q Great. You apply in this section what
11 are called the Gore factors; is that correct?

12 A That's correct.

13 Q Okay. Are you under the impression that
14 the Gore factors are applicable in a Price-
15 Anderson Act case?

16 MR. McCLAIN: Object to the form of the
17 question that this is a Price-Anderson Act case.
18 Nobody but this judge thinks so.

19 MR. McGAHREN: Objection to the
20 objection.

21 MR. ZAGER: I'll join in the objection
22 to the objection.

23 BY MR. ZAGER:

24 Q But go ahead.

25 A Can I object?

1 Q Yeah.

2 A Well, I don't have an opinion about its
3 relevance with respect to Price-Anderson cases. I
4 do have an opinion that Gore factors are broadly
5 relevant in cases where one is trying to conduct
6 some type of allocation of contamination.

7 Q Okay. Are you aware of the Gore factors
8 ever being used in a personal injury case like
9 this?

10 A I -- I don't know if I would know that.
11 But in my own anecdotal experience, I -- I
12 can't -- I can't think of having done it myself in
13 a personal injury case. I've done it before on
14 conventional, you know, sites.

15 Q Okay. On page, I guess it's 19, you've
16 got a reference there that under the scheduling
17 order, you were asked for organ doses attributable
18 to Cotter's operations at Latty Avenue and
19 Mallinckrodt's operations at SLAPS. Is that
20 correct?

21 MR. MCGAHREN: What page? I'm sorry.

22 MR. ZAGER: It's at the bottom of
23 page 19. It's the first sentence under "Notes of
24 Allocation."

25 THE WITNESS: I'm -- I'm just trying to

1 be a stickler here.

2 BY MR. ZAGER:

3 Q Good.

4 A I wasn't asked about that.

5 Q Frankly, that's where you -- that's
6 where I was going. You didn't calculate any type
7 of organ dose, correct?

8 A No.

9 Q All right. So, in other words, your
10 allocation is not based on any type of dose to any
11 individual plaintiff or any hypothetical person,
12 is it?

13 A I'll -- I'll let it speak for itself,
14 but it really isn't talking about people.

15 Q Okay. The Gore factors that you -- have
16 you only seen the Gore factors used in CERCLA
17 cases?

18 A Let me think about that.

19 Q Or a state CERCLA case, state version
20 CERCLA.

21 A I'm not sure if that's true. I mean
22 when -- whenever there's a dispute about multiple
23 responsible parties having to divvy up cleanup
24 responsibilities or -- or some other consequences
25 of contamination, I've seen Gore factors used. So

1 I don't think sitting here that I've only seen it
2 limited to CERCLA cases. This is a CERCLA case,
3 but --

4 Q You think this is a CERCLA case?

5 A Well, the -- the north St. Louis sites
6 are a Superfund site.

7 Q I just want to be clear, though, this
8 particular case for which you're giving your
9 deposition, you understand it's not a CERCLA case.

10 A Oh, I -- I don't really know that, and I
11 don't think that's relevant to my opinions.

12 Q Okay. With respect to -- this is on
13 page 20 of your report. With respect to these
14 Notes on Allocation, you appear to be using the
15 time period for Mallinckrodt from 1946 to '66,
16 correct?

17 A That's correct.

18 Q You're not -- I think we established
19 earlier, though, that you're not offering the
20 opinion that Mallinckrodt is responsible for that
21 period from 1946 to 1953, when they actually
22 became under contract for SLAPS.

23 A Well, let me clarify what I was asked to
24 do here. I was asked to evaluate a potential
25 allocation scheme under the assumption that any

1 party that was active or operating at a site could
2 be considered fully responsible. So that was kind
3 of an -- an assumption that I was asked to
4 incorporate into this allocation note.

5 Q But you didn't allocate any
6 responsibility to the Atomic Energy Commission
7 that operated SLAPS from 1946 to July 20th, 1953.

8 A That's right. I was -- I was asked not
9 to evaluate allocations for folks that aren't
10 party to this case.

11 Q Okay. So you agree that they would have
12 contributed to offsite releases, but you didn't
13 allocate fault to it, fair?

14 MR. McCLAIN: Object to the form of the
15 question.

16 THE WITNESS: My only problem with that
17 question is "fault" -- the word "fault." I don't
18 think I used that word in my report. But, no,
19 I -- I didn't explicitly allocate any
20 responsibility to -- to that agency.

21 BY MR. ZAGER:

22 Q You also didn't for Continental Mining
23 or Continental Metals or, frankly, the -- the
24 Airport Authority, correct?

25 A That's correct.

1 Q Do you have any evidence that any of the
2 plaintiffs in this case were exposed to radon from
3 this site?

4 A I haven't done any kind of analysis with
5 respect to the actual plaintiffs. So I -- it's
6 just out of my wheelhouse.

7 Q Okay. The same would be true for the
8 thorium-230?

9 A The -- the only reason I'm pausing is
10 because, even though it's obvious those -- those
11 aren't opinions that I have, I have some knowledge
12 of the kind of levels that are found downstream
13 and things like that. So I -- I don't expect
14 anyone would ever ask me that, and I would
15 probably answer this way, which is I'm not a
16 toxicologist; I don't have an opinion about that.

17 Q Okay. With respect to your, I guess,
18 chart on page 22, where you talk about pre-1966,
19 1966 to 1973, and post-1973, are those allocations
20 there where you have 100 percent to SLAPS, zero to
21 HISS; 90 percent to SLAPS, 10 percent to HISS; and
22 then 90 percent to SLAPS, 10 percent for HISS --
23 all that's respectively -- are those based on any
24 type of calculations of the concentrations that
25 were released at any particular time?

1 **A No. This is based on -- on operational**
2 **time. This is based on time.**

3 Q And it's not broken out by all
4 potentially responsible parties, including the
5 AEC, Continental Mining, Continental Metals, or
6 the Airport Authority, correct?

7 **A Yeah, that wasn't -- that wasn't my**
8 **charge here. I was asked to look at allocation**
9 **for the parties that are subject to this case.**

10 Q Okay. All right.
11 (Exhibit No. 13 was marked for
12 identification.)

13 BY MR. ZAGER:

14 Q Next I'm going to hand you what I marked
15 as Exhibit 13.

16 Go ahead and take a look at that, and
17 tell me if you recognize that document.

18 **A Yes, I do. This is my supplemental**
19 **expert report.**

20 Q Okay. The opinions in your supplemental
21 report -- just to try to speed this up a little
22 bit, the supplemental opinion number 1. Do you
23 see that?

24 **A I do.**

25 Q All right. That's directed at Cotter,

1 not Mallinckrodt; is that fair?

2 MR. McGAHREN: Object.

3 THE WITNESS: That's correct.

4 BY MR. ZAGER:

5 Q The -- the second, I guess it's,
6 full sentence under supplemental opinion 1 says:
7 "Since completion of my expert report, I have
8 learned that in 1970 the Division of Air Pollution
9 Control of the St. Louis County Health Department
10 found the drying operation to be in violation of
11 county regulations."

12 Is that correct?

13 **A Correct.**

14 Q Okay. Did you, in reviewing those
15 St. Louis County Health Department records, find
16 any criticisms by the County of Mallinckrodt's
17 operation at SLAPS?

18 **A I didn't do a complete search of all**
19 **their records, but I didn't -- did not come across**
20 **that, no.**

21 Q Okay. Let's go then to supplemental
22 opinion number 2.

23 With the objection of -- for Cotter's
24 counsel, that also is directed at Cotter, not
25 Mallinckrodt, correct?

1 **A That's correct.**

2 Q Okay. Let's go then to supplemental
3 opinion number 3: "Defendants' possession, use
4 and/or transfer of waste at SLAPS and Latty Avenue
5 caused excessive radiation to be released in the
6 form of contaminated sediments into Coldwater
7 Creek and tributary ditches."

8 Did I read that correctly?

9 **A Yes.**

10 Q Okay. We've already talked about your
11 opinion -- or you expressed some statements about
12 the ALARA principle, correct?

13 **A Correct.**

14 Q We've talked about 10 CFR 20.106 and the
15 effluent limitations and your opinions about
16 exceedances of that for radon and thorium-230
17 using the soluble limit, correct?

18 **A At the SLAPS site, right. Correct.**

19 Q Is there anything new in this
20 supplemental opinion related to Mallinckrodt
21 beyond those issues that we just discussed?

22 **A I wouldn't say there's anything new**
23 **here. Because my initial report, I -- I was**
24 **focusing on the -- the judge's order, I -- there's**
25 **some language in my original report that talks**

1 **about contaminated sediments and -- you know, and**
2 **Coldwater Creek, but there's not a -- an official**
3 **opinion. And so this is just a way of creating an**
4 **official opinion about impacts to Coldwater Creek.**

5 Q Okay. Your official opinion about
6 Coldwater Creek is that you believe that there was
7 sediment in the creek, correct, from -- from the
8 SLAPS site?

9 A **Contaminated sediments in the creek,**
10 **that's correct.**

11 Q For any given year from July of 1953 to
12 February 14th of 1966, have you been able to
13 quantify any releases of sediment from SLAPS?

14 A **You know, we've talked about this before**
15 **with other media. I just don't think there's**
16 **enough data that -- that was collected such that**
17 **you could quantify those releases.**

18 I do believe that the releases were
19 **occurring, but I don't think I or -- I don't think**
20 **with the data that we have available that we could**
21 **quantify that in an annual way.**

22 Q Okay. Your two reports and your
23 opinions related to Mallinckrodt are limited to
24 SLAPS, correct? In other words, you didn't form
25 any opinions about any other site or facility

1 operated or owned by Mallinckrodt.

2 **A That's correct. We -- we talked a**
3 **little bit about the haul roads. There's some --**
4 **there's some verbiage in my report about the haul**
5 **roads, and I stand by that, but that would be it.**

6 Q Okay. Going back to the sediment issue,
7 the sediment in Coldwater Creek, you haven't been
8 able to quantify or identify any releases by
9 party; in other words, by Mallinckrodt or the
10 Atomic Energy Commission or by potentially
11 releases that occurred when the St. Louis Airport
12 Authority was responsible for that site. Is that
13 fair?

14 **A It's not quite fair to say that I**
15 **haven't been able to do that. I -- I didn't try**
16 **to do that.**

17 Q Okay. There's also some references, I
18 think you talked about mud in the ditches. That's
19 not actually in Coldwater Creek, correct? And
20 that would be retained in the ditch itself.

21 **A Well, it was sampled from the ditch, but**
22 **those ditches are tributaries to the creek, so**
23 **there -- some of that sediment is on its way to**
24 **the creek.**

25 Q But some of it would stay retained in

1 the ditch as well.

2 **A Some of it would.**

3 Q It would then be cleaned up by FUSRAP?

4 **A Hopefully.**

5 MR. ZAGER: I may have a few follow-ups,
6 but in the interest of time, I'm going to pass the
7 witness to Mr. McGahren.

8 Thank you very much.

9 THE WITNESS: Thank you.

10 MR. MCGAHREN: Take a break.

11 THE VIDEOGRAPHER: Going off the record.

12 The time is 3:03 p.m.

13 (Recess.)

14 THE VIDEOGRAPHER: Going on the record.

15 The time is 3:10 p.m.

16 EXAMINATION

17 BY MR. MCGAHREN:

18 Q Dr. Wells, my name is John McGahren.

19 I'm with Morgan, Lewis & Bockius, and I represent
20 Cotter Corporation.

21 Are you familiar with Cotter
22 Corporation?

23 **A Yes.**

24 Q And you recognize you're still under
25 oath here?

1 **A Yes.**

2 Q I'd like you to open up Exhibit 2, your
3 resume again.

4 **A Okay. I'm with you.**

5 Q You identified the former Sylvania site
6 in Hicksville, New York, correct?

7 **A Correct.**

8 Q And there you represent -- you identify
9 representative project experience at the former
10 Sylvania site, correct?

11 THE REPORTER: I'm sorry, I couldn't
12 hear you.

13 BY MR. McGAHREN:

14 Q I said, there you recognize -- or you
15 represent project experience on the former
16 Sylvania site, correct?

17 **A Correct.**

18 Q Okay. This was an actual project that
19 you conducted at the Sylvania site?

20 **A This was actually a litigation support**
21 **project, so I was assessing the site investigation**
22 **remediation work conducted by others.**

23 Q Okay. And on your list of depositions
24 and trial testimony, 2009, DePascale, do you see
25 that in your CV?

1 **A Yes.**

2 Q Is that the same thing?

3 **A Yes, it is.**

4 Q So basically your -- your experience
5 with respect to the Sylvania site is you were an
6 expert in litigation; is that correct?

7 **A That's correct.**

8 Q Did you actually testify at trial?

9 **A Yes.**

10 Q You did. Did Dr. Everett -- excuse
11 me -- is Mr. Everett a doctor? Does he have a
12 Ph.D.?

13 **A He is, yeah. He has -- I think he has a**
14 **couple of them.**

15 Q Did Dr. Everett also testify?

16 **A He did, yes.**

17 Q He did. Okay. Did you submit a joint
18 report?

19 **A I believe that's correct, yeah.**

20 Q Okay. And on what subject did you
21 testify?

22 **A I testified -- my role was principally**
23 **look- -- describing the nature and extent of**
24 **contamination that remained after the site had**
25 **been redeveloped, and the degree to which workers**

1 in that redeveloped facility might be exposed
2 to -- to contaminants by the mechanism of vapor
3 intrusion principally.

4 Q Okay. So your experience on that site
5 had nothing to do with radionuclides, correct?

6 A Well, there were radionuclides at the
7 site. We took a careful look at that, but we --
8 we realized that for this time frame we were
9 looking at that that was not likely a driving
10 force of chemical exposure.

11 Q You testified that your role was to look
12 at vapor intrusion; is that correct?

13 A That's correct, among other things. The
14 other thing that I did a lot of work on was just
15 evaluating the nature and extent of contamination
16 at the site.

17 Q Is vapor intrusion an issue with respect
18 to radionuclides? Are they volatile?

19 A They're -- well, radon is, but the way
20 we generally think about vapor intrusion, we
21 generally think about the VOCs or volatile organic
22 chemicals.

23 Q And in your report and testimony, you
24 were looking at volatile organic chemicals,
25 correct?

1 **A For the vapor intrusion assessment,**
2 **that's correct.**

3 Q Which was your sole role in it, correct?

4 **A No, my other role was to evaluate the**
5 **nature and extent of contamination, including**
6 **radionuclides, in the subsurface that persisted in**
7 **this property in the redeveloped state.**

8 Q Did you detail your evaluation of the
9 nature and extent of radionuclides in your expert
10 report in that case?

11 **A We took a close look at that, but I -- I**
12 **don't think there's a really detailed discussion**
13 **of that in the expert report, no.**

14 Q The Gallagher & Kennedy litigation
15 support work, again, that was not project work.
16 That was litigation related, correct?

17 **A That's correct. I've subsequently done**
18 **a little project work out there, but the -- the**
19 **case that we're talking about was litigation**
20 **support.**

21 Q What's the name of that site?

22 **A It's called Whittaker-Bermite.**

23 Q Okay. Is it in Santa Clarita,
24 California?

25 **A Yes.**

1 Q Okay. And the radioactive compound
2 there was depleted uranium?

3 A Yes.

4 Q What is depleted uranium?

5 A Depleted uranium is -- is uranium that's
6 not excessively radioactive, and it's used in --
7 as I understand it, in military operations for
8 things like armor plating on tanks.

9 Q Okay. I'm asking you specifically why
10 they call it depleted uranium.

11 A Oh. Well, I don't know the details of
12 the chemical processing, but it's depleted of
13 highly radioactive isotopes.

14 Q Which isotopes?

15 A I'm not sure specifically.

16 Q Okay. So you're here testifying in a
17 case involving radiation exposures, and you don't
18 know what depleted uranium is; is that correct?

19 A Well, depleted uranium isn't a compound
20 of concern at -- at this site. And as I said
21 before, I'm -- I'm an expert in contaminant fate
22 and transport. I'm not a nuclear chemist. But I
23 am an expert in the mechanisms by which
24 contamination of any chemical type is transported
25 and distributed in the environment.

1 Q And yet you're opining on subjects like
2 solubility of radio- -- radioactive isotopes like
3 thorium-230, correct?

4 MR. McCLAIN: Only because he was asked.

5 BY MR. MCGAHREN:

6 Q Do you really have expertise concerning
7 solubility of thorium-230?

8 MR. McCLAIN: Object to the form of the
9 question. It's not for him to determine his
10 expertise.

11 THE WITNESS: Well, I have enough
12 expertise to make the call that that was the
13 appropriate parameter to utilize in Table 2 of
14 10 CFR Section 20. So, you know, this -- making
15 that call is not about quantifying the solubility
16 of a compound. It's interpreting a regulation and
17 applying it to the real world.

18 BY MR. MCGAHREN:

19 Q Talking about the Whittaker-Bermite
20 site, you've identified radioactive materials
21 there. What percentage of the cleanup costs were
22 involved in radioactive materials that you
23 evaluated?

24 **A I don't have an exact number on that,**
25 **but it would probably be something on the order of**

1 **10 percent for screening of the site and then**
2 **removal.**

3 Q Wasn't the Whittaker-Bermite site
4 primarily a perchlorate site?

5 A Well, that was the most glamorous
6 contaminant because it had migrated a couple of
7 miles and had impacted a couple of water supply
8 wells for Santa Clarita. But there were really a
9 multitude of contaminants at that site, including
10 volatile organic compounds. There was a very
11 large amount of soil vapor extraction that was
12 conducted, and that wasn't about perchlorate.
13 There were metals and there was depleted uranium.
14 There was also unexploded ordnance.

15 Q Did the cleanup costs at the
16 Whittaker-Bermite site exceed \$250 million, to
17 your -- to your knowledge?

18 A I don't know what the final cleanup cost
19 was.

20 Q But you believe roughly 10 percent of
21 that or at least 25 million was expended on
22 cleanup of depleted uranium; is that correct?

23 A I don't know what the total cost was.
24 I -- I can tell you about our -- our cost
25 estimates, and that's an approximate -- that's an

1 **approximate evaluation or assessment of the**
2 **depleted uranium part. But I don't -- you know,**
3 **it's -- the cleanup has gone on for many, many**
4 **years, and I don't know what the total cost was.**

5 Q Were there any NRC licenses involved in
6 the Whittaker-Bermite site?

7 A **Not that I know of.**

8 Q Any AEC licenses?

9 A **Not that I know of.**

10 Q Was any processing of nuclear material
11 conducted at that site?

12 A **There was fabrication of -- of elements**
13 **of missiles and tanks and things like that that**
14 **included depleted uranium. I don't know if I'd**
15 **call that processing. I think I'd call it**
16 **fabrication. There was also testing of weapons.**

17 Q And to your knowledge, was the depleted
18 uranium processed in any manner at that site or
19 just tested in -- in ammunition?

20 A **To my knowledge, it was -- it was**
21 **fabricated and tested.**

22 Q And then your other experience on sites
23 involving nuclear facilities was Hanford when you
24 were a graduate student?

25 A **Correct.**

1 Q What were -- who were the other members
2 of that board? Were there people that actually
3 graduated from graduate school?

4 A **Most of the members of the board were**
5 **faculty members, and then there were a handful of**
6 **graduate students.**

7 Q And what was the role of the graduate
8 students? Was it a learning experience for them
9 or were they actually advising the State of
10 Washington?

11 A **We were collectively advising the State**
12 **of Washington. I think, as is often the case with**
13 **graduate students, our role was to do a lot of the**
14 **work that the faculty members had -- you know, had**
15 **asked of us.**

16 Q And the other experience you described
17 was with respect to a facility in Idaho, correct?

18 A **Correct.**

19 Q And what exactly did you do there that
20 had anything to do with nuclear materials or
21 processing of nuclear materials?

22 A **Well, what we were helping out INEL with**
23 **was devising and implementing vadose zone**
24 **monitoring strategies for -- for waste facilities.**

25 Q For volatile organic compounds again?

1 **A** No, for -- for anything, including
2 radionuclides. Really what we're testing is --
3 what we're talking about there is monitoring the
4 chemistry and the flow of water above the water
5 table.

6 **Q** Where in your resume specifically is
7 that identified?

8 **A** I don't think that's in my resume. You
9 know, this -- this resume just has representative
10 project experience. It doesn't have every single
11 project.

12 **Q** Which company were you working for when
13 you did this work?

14 **A** I was working for Metcalf & Eddy at that
15 time.

16 **Q** Any other experience on nuclear
17 manufacturing sites or facilities that held
18 licenses from either the AEC or the --

19 THE REPORTER: I'm sorry, I couldn't --
20 BY MR. MCGAHREN:

21 **Q** -- licenses from either the AEC or the
22 NRC?

23 **A** No.

24 **Q** Now, you've relied on a report in
25 forming your opinions prepared by Risk Assessment

1 Corporation, correct?

2 **A** **I -- I relied on some of the**
3 **calculations that they made in that report, yes.**

4 **Q** **Who is Risk Assessment Corporation?**

5 **A** **Well, it's a -- it's a company -- I**
6 **think the senior author on that report is**
7 **Dr. Till. It's a -- it's a company that provides**
8 **environmental consulting, and in particular, risk**
9 **evaluations.**

10 **Q** **Do you know Dr. Till?**

11 **A** **No, I don't.**

12 **Q** **Are you familiar with his qualifications**
13 **and experience?**

14 **A** **I -- I've looked at his resume.**

15 **Q** **So that's all you -- you read the**
16 **report?**

17 **A** **I have.**

18 **Q** **Okay. Why did you choose that source to**
19 **base your calculations on?**

20 **A** **I chose that source because it -- it**
21 **contained some analyses and calculations that were**
22 **useful in conducting my analysis of -- of trying**
23 **to find a way to estimate concentrations in air**
24 **and water along the fence line of these**
25 **facilities. So it was information that was useful**

1 **in formulating my own opinions.**

2 Q Was that a peer-reviewed report that was
3 published in some scientific journal or treatise?

4 A **To my knowledge, that is essentially an**
5 **expert report in either this case or a related**
6 **case.**

7 Q Do you know if Dr. Till and his team
8 represent any of the litigants in this case?

9 A **I don't precisely know who -- who they**
10 **might represent.**

11 Q In the case that they wrote that report
12 for, did they represent Mallinckrodt?

13 A **I mean, we can -- we can look that up.**
14 **I'm sure they say, but I -- I don't specifically**
15 **know.**

16 Q You don't think that's important to
17 know?

18 A **Well, I think it's important to look at**
19 **the credentials of -- of the author, to look at**
20 **their methodology, which I did, and I -- I found**
21 **it to be useful.**

22 Q Now, you conducted an allocation in your
23 expert report in this case, correct?

24 A **Correct.**

25 Q And who was that allocation between,

1 which parties?

2 **A That allocation -- well, the -- it's**
3 **between for the SLAPS site and the HISS site, and**
4 **I'm associating releases from those sites with**
5 **Cotter for HISS or Latty Avenue and Mallinckrodt**
6 **for SLAPS.**

7 MR. MCGAHREN: I'm sorry. Could you
8 read back that answer?

9 (Whereupon, the requested record
10 was read.)

11 BY MR. MCGAHREN:

12 Q Okay. So basically is it fair to say
13 that you've used Mallinckrodt's expert to base
14 your calculations on with respect to releases from
15 the Latty Avenue site, correct?

16 A I -- well, once again, I don't
17 explicitly know who Dr. Till was working for. But
18 it is true that I relied on his work for my
19 assessment of air emissions from the waste drying
20 operation at the Latty Avenue site.

21 Q Do you know if Dr. Till was being paid
22 by Mallinckrodt?

23 A I -- I don't know who was paying
24 Dr. Till.

25 Q Do you know if he -- strike that.

1 Do you know how much Dr. Till and his
2 team were paid to prepare their report by
3 Mallinckrodt?

4 MR. McCLAIN: He says he doesn't know
5 that Mallinckrodt paid him, so how could he know
6 how much Mallinckrodt paid him?

7 MR. McGAHREN: You can answer.

8 MR. McCLAIN: So, I mean, the same
9 answer.

10 BY MR. McGAHREN:

11 Q You can answer my question.

12 MR. McCLAIN: He doesn't know.

13 THE WITNESS: I -- I don't know who paid
14 Dr. Till, and I don't know how much.

15 BY MR. McGAHREN:

16 Q Okay. Do you consider that to be good
17 scientific practice to rely upon a biased expert's
18 report in preparing your calculations?

19 MR. McCLAIN: Well, how does he know
20 he's -- he's biased?

21 MR. ZAGER: Object to the form.

22 THE WITNESS: I didn't find his report
23 to be biased. We spoke a little bit earlier that
24 I don't agree with every single assumption and --
25 and analysis in that report, but I -- I didn't

1 find that report to be biased, at least the parts
2 that I relied upon that I looked at in great
3 detail.

4 BY MR. MCGAHREN:

5 Q Is it fair to say, though, that that is
6 not a peer-reviewed report that was published in
7 any scientific journal --

8 MR. McCLAIN: Stipulated.

9 BY MR. MCGAHREN:

10 Q -- paper or treatise?

11 MR. ZAGER: Object to the form,
12 compound.

13 MR. McCLAIN: It's stipulated.

14 I -- don't worry about answering it.
15 I've already stipulated it's not peer-reviewed.

16 BY MR. MCGAHREN:

17 Q You can answer the question, sir.

18 MR. McCLAIN: Why if I've stipulated to
19 it? It's not in dispute.

20 MR. MCGAHREN: Because I want his
21 answers.

22 THE WITNESS: To my knowledge, that
23 report was not published in a peer-reviewed
24 journal.

25 BY MR. MCGAHREN:

1 Q Did Dr. Till author that report by
2 himself?

3 A No, he describes a team that assisted
4 him.

5 Q Do you know any members of the team?

6 A No, I don't.

7 Q Do you know their qualifications and
8 experience?

9 A No.

10 Q Did they do modeling in that report?

11 A They did some modeling in that report,
12 yes.

13 Q What type of modeling?

14 A Well, they did a variety of modeling.
15 They did some modeling on resuspension of
16 sediments that would have been released along the
17 haul routes.

18 Q Did you -- sorry, finish your answer.

19 A Yeah. They did modeling of the
20 emissions from the drying operation at the Latty
21 Avenue site. And then I know they did a bunch of
22 exposure modeling, which is not my area of
23 expertise.

24 Q And you may have been asked this
25 question earlier, but I don't recall your answer.

1 Are there parts of that report that you can
2 identify specifically now that you disagree with?

3 **A** Well, at the -- at the risk of repeating
4 myself, we talked earlier about his assumption
5 about the grain size distribution of the waste
6 materials. And I don't want to go so far as to
7 say I disagree with it, but I think I possess some
8 information that he might not have had that would
9 have allowed one to refine that estimate of grain
10 size distributions. The end result of doing so,
11 which would have been to make some corrections to
12 the grain size distribution that he used in his
13 report toward the finer grain sediments, it
14 actually would have increased his modeling results
15 for airborne transport and deposition.

16 So, that's one of the uncertainties in
17 this analysis that kind of works in -- in the
18 direction of underestimating the results.

19 **Q** And you testified earlier your basis for
20 that was data from the West Lake site; is that
21 correct?

22 **A** Correct.

23 **Q** Okay. Was material that was at the West
24 Lake site dried by Cotter at Latty Avenue?

25 **A** No.

1 Q Okay.

2 A Not to my knowledge.

3 Q So the information you relied upon was
4 for material that was never run through the dryer,
5 correct?

6 A That's correct, it wasn't run through
7 the dryer. But let me just -- let me just say, I
8 didn't rely on that for my own calculations. I
9 actually used the coarser grain estimates that
10 Dr. Till tabulated.

11 Q You just testified a few moments ago
12 that you have information to refine Dr. Till's
13 estimate. What is that information?

14 A That information is descriptions in
15 boring logs from the West Lake Landfill site
16 investigation.

17 Q But again, that's material that was
18 never run through the dryer, correct?

19 A That's material that wasn't run through
20 the dryer, that's correct.

21 Q So it would have no bearing on emissions
22 from the dryer and your fence line calculations at
23 Latty Avenue, correct?

24 A Well, it has a bearing on -- on the
25 material properties of waste coming out of

1 **Mallinckrodt. So we -- we don't have specific**
2 **information about each waste type and as to**
3 **whether or not they had different physical**
4 **characteristics, so we're making an estimate of**
5 **the average grain size distribution of all the**
6 **wastes.**

7 Q Who -- when you say the word "we," who
8 are you referring to?

9 A **Well, Dr. Till did that, and I did the**
10 **same.**

11 Q So you're -- when you say "we," you mean
12 yourself and Dr. Till?

13 A **I mean, we -- we both arrived at that**
14 **conclusion independently.**

15 Q Okay. What did you look at to try and
16 investigate the properties of the materials when
17 they were sitting on SLAPS?

18 A **Well, I looked at the totality of the**
19 **historical reports about operations at the site**
20 **and -- and descriptions of the waste material.**

21 Q So you -- can you identify specifically
22 reports? Are they only the reports that are
23 annotated in your initial and supplemental expert
24 reports?

25 A **Yes.**

1 Q You didn't look at anything else.

2 A No, nothing that I relied on.

3 Q Now, you used the term "grain size" when
4 you were describing the material, correctly --
5 correct?

6 A I did use that term, yes.

7 Q You don't use the term "particle size,"
8 do you?

9 A You mean ever?

10 Q In your testimony today, you've used the
11 word "grain size," correct?

12 A That's correct, because what we were
13 talking about earlier is the grain size
14 distribution of the source material.

15 Q Mm-hmm.

16 A When we talk about airborne deposition
17 and transport, then we talk about particle size.
18 It's really -- we're talking about the same thing,
19 but there's a slight difference in the
20 terminology.

21 Q Are you an air modeler?

22 A Air modeling is -- is in my expertise.
23 I'm not the guy that sits down and runs the model.

24 Q How is it in your expertise?

25 A It's an analytical scientific tool that

1 I use in the course of my professional practice.

2 Q What about, have you run AERMOD?

3 A I don't personally run AERMOD, but
4 I've -- I've directed the use of AERMOD, and I've
5 worked on a number of projects where AERMOD is
6 employed.

7 Q When you say you've directed the use of
8 AERMOD, in what sense have you directed it?
9 Identifying source terms?

10 A Yeah, working usually with a team,
11 including, you know, a nuts and bolts modeler, to
12 define what we might call the conceptual site
13 model: What -- what actually is it that we're
14 trying to model here and how best to implement
15 that within the numerical model.

16 Q But you actually hand that work off to
17 an air modeler, an expert air modeler, correct?

18 A In the projects that I direct, I direct
19 how the model is to be constructed, what the input
20 parameters are, oftentimes with input from team
21 members, and then I leave it to a modeler to
22 actually construct and run the model.

23 MR. MCGAHREN: Could you read back that
24 answer, please?

25 (Whereupon, the requested record

1 was read.)

2 BY MR. McGAHREN:

3 Q What input parameters are you referring
4 to specifically?

5 A Well, I mean, it depends on -- on the
6 case, but let's -- let's take, for example, the
7 Chemetco case that we talked about a little bit
8 earlier. What we would do there is we would build
9 in a source term for a stack emission, and we
10 would have information not only about the mass
11 emissions rate but also information about particle
12 sizes.

13 Q Are you a chemical engineer?

14 A No, I'm not.

15 Q Do you have expertise in chemical
16 engineering?

17 A No, I'm a -- I'm an environmental
18 geologist.

19 Q Do you have expertise in reverse
20 engineering of chemical process?

21 A No, I don't.

22 Q Do you believe Mallinckrodt was running
23 a chemical process downtown which resulted in
24 these waste materials?

25 MR. ZAGER: Object to the form.

1 THE WITNESS: I -- I don't really have,
2 you know, an opinion about that. That's outside
3 my area of expertise.

4 BY MR. MCGAHREN:

5 Q So you have no expertise with respect to
6 the process that generated these wastes that were
7 put at SLAPS, correct?

8 A That's correct. I -- you know, I have
9 certain knowledge of -- of what Mallinckrodt was
10 doing, but I'm not a chemical engineer and I don't
11 have expertise in that area.

12 Q Okay. Do you know if Dr. Till is a
13 chemical engineer?

14 A We can double-check his resume, but I
15 believe he is.

16 Q Are you familiar with whether or not he
17 has expertise in reverse engineering chemical
18 processes?

19 A I wouldn't have any knowledge of that.

20 Q Okay. Do you know if any member of his
21 team is a chemical engineer?

22 A I -- I would suggest to you that for at
23 least my part of this work, that's not necessary
24 to have a chemical engineering background, but
25 I -- I really don't know the background of his

1 **team members.**

2 Q You've identified grain size as an
3 important parameter, correct?

4 **A Correct.**

5 Q So how do you arrive at grain size? You
6 just use Dr. Till's numbers?

7 **A Well, what -- what -- I looked for grain**
8 **size analysis. I mean, it's not that hard to**
9 **measure, grain size analysis for a solid. So I**
10 **looked for grain size analyses. I didn't find any**
11 **in the technical records.**

12 It turns out, as I read Dr. Till's
13 report, he -- he did too. He looked for actual
14 grain size measurements, and by my reading of his
15 report, he didn't find that either. So what he
16 decided to do was to go to the literature and find
17 grain size analyses from uranium mine tailings,
18 and utilized that measured data as reasonably
19 representative of the grain size distribution of
20 the waste material at SLAPS and Latty Avenue.

21 Q What are uranium mine tailings?

22 **A Uranium mine tailings are the waste**
23 **product from the processing of uranium ore.**

24 Q Have you had -- ever had experience with
25 a uranium mill and processing of uranium ore?

1 **A I've never worked at a uranium mill, no.**

2 Q My question was have you had any
3 experience with that?

4 **A I'm not sure what the difference is.**
5 **I've not worked at uranium mill sites.**

6 Q Well, people could have experience with
7 respect to uranium mills but not worked there. So
8 you have no experience with uranium mills,
9 correct?

10 MR. McCLAIN: Object to the form of the
11 question. It's vague and ambiguous.

12 THE WITNESS: I -- I've got a fair
13 amount of experience at mine sites and -- and
14 tailing sites, but not uranium mill sites.

15 BY MR. MCGAHREN:

16 Q What's your experience with mine sites
17 and tailing sites? Is it all outlined in your CV?

18 **A I'm not sure if it's all outlined in my**
19 **CV. One project that I'm working on right now**
20 **that I've -- I've worked on for a few years is**
21 **evaluating environmental impacts of a proposed**
22 **mine and tailings facility in Arizona.**

23 Q Which one is that?

24 **A It's the proposed Resolution Copper**
25 **mine.**

1 Q In Arizona?

2 A Correct.

3 Q Would you characterize the material that
4 came out of Mallinckrodt's downtown processes as
5 uranium mill tailings?

6 MR. ZAGER: Object to the form and
7 foundation.

8 THE WITNESS: They're not specifically
9 uranium mill tailings, but they're waste materials
10 from the processing of uranium ores.

11 BY MR. MCGAHREN:

12 Q But they're not uranium mill tailings,
13 correct?

14 A I'm -- I'm not sure that that's a term
15 of art, but I -- I wouldn't have called them
16 uranium mill tailings.

17 Q Do you know why Dr. Till chose uranium
18 mill tailings for his particle size analysis?

19 A He concluded, and I -- I also concluded,
20 that that's a reasonable proxy for waste materials
21 from mineral processing.

22 Q Now, you're saying "he." Are you sure
23 that Dr. Till specifically opined on that in his
24 report; is that correct?

25 A Oh, as opposed to a team member --

1 Q Correct.

2 A -- of his? I'm assuming that the work
3 in that report is Dr. Till's -- that Dr. Till
4 is -- is standing behind the conclusions and the
5 analysis in that report.

6 Q And what does that mean?

7 A That means that I'm -- I'm assuming that
8 Dr. Till's responsible for the findings in that
9 report.

10 Q Why are you assuming that?

11 A Because he's the senior author.

12 Q But he may not be an expert with respect
13 to any particular topic in that report, correct?

14 A I would -- I would suggest that within
15 the realm of the legal definition of "expert,"
16 that that's not up to me.

17 Q Well, I'm not asking you for a legal
18 opinion on an expert. You relied on Dr. Till,
19 correct?

20 A I relied on some of the calculations and
21 data compilation that Dr. Till reported.

22 Q But you don't know which part of this
23 report is Dr. Till's work product versus some
24 other member of the team, correct?

25 A Well, once again, I'm making an

1 assumption, which I think is reasonable, that --
2 that this represents Dr. Till's opinions. I
3 recognize that he had other people helping him,
4 but it's my assumption that this is Dr. Till's
5 analysis that he stands behind.

6 Q And the entire team was working for
7 Mallinckrodt in preparing this report, correct?

8 A Well, I think we talked about this
9 before. I don't specifically know who all
10 Dr. Till was working for.

11 Q Do you know why they modeled the Latty
12 Avenue dryer?

13 A Well, I know what kind of results they
14 were trying to get. They were -- they were --
15 they were looking for mass release rates. So as
16 to why they decided to do that, I don't know.

17 What I looked at was the methodology
18 that they used, and I found it to be sound.

19 Q Which aspects of the report did you find
20 to be sound?

21 A Well, what we were just talking about
22 now is Dr. Till's analysis of emission rates from
23 the Latty Avenue drying operation.

24 MR. McGAHREN: What's the next exhibit
25 number?

1 THE REPORTER: 14.

2 BY MR. McGAHREN:

3 Q Okay. Dr. Wells, I'm marking a document
4 for identification as Exhibit 14.

5 (Exhibit No. 14 was marked for
6 identification.)

7 BY MR. McGAHREN:

8 Q I'm going to hand you this document.

9 And hand one to your counsel.

10 Now, you testified that you didn't agree
11 with Dr. Till with respect to the particle size
12 analysis, correct?

13 A No, that's not exactly what I testified
14 to. I said I thought I had some additional
15 information that would be relevant to that. I
16 believed that his use of the particle size
17 distribution was reasonable under the
18 circumstances that we didn't have direct
19 measurements.

20 Q But you testified earlier that he used
21 more of a percentage of sand; is that correct?

22 A That's correct.

23 Q Sand size particles.

24 A That's correct.

25 Q And you disagreed with that.

1 **A** I don't actually disagree with it. I --
2 I look at it this way: I look at that as a
3 conservative estimate, because if you were to run
4 these calculations using a grain size distribution
5 that included more finer grained sediments, you
6 would -- you would actually get higher
7 concentrations in the air.

8 So I looked at it as a conservative
9 assumption, one that could be refined in the
10 future should we actually turn up some actual
11 measurements of grain size distributions, but that
12 under the circumstance is a reasonable assumption
13 to make.

14 **Q** You relied on this particular document
15 that I've marked as Exhibit 14, correct?

16 Have you seen that document before?

17 **A** Yes, I have.

18 **Q** Okay. And you relied on that document,
19 correct?

20 **A** Yes.

21 **Q** Can I refer you to page 5 of the
22 document. This is an NR -- excuse me, an AEC
23 inspection report, correct?

24 **A** This is the report that's dated
25 November 17th, 1970, and it is an inspection

1 **report.**

2 Q Okay. So these are observations of AEC
3 inspectors that were made while the material was
4 on the Latty Avenue site, correct?

5 A **That's my understanding of this report,**
6 **yes.**

7 Q And -- and let me refer you to page 5.

8 A **Okay.**

9 Q Procedure -- under Procedures,
10 No. 23, if you go down to about five lines up, the
11 AEC inspectors write: "The approximately particle
12 size of the newly dried material appears to be
13 somewhat like sand or cinders."

14 Do you have any reason to disagree with
15 that?

16 A **I don't have any reason to disagree**
17 **that -- you know, that that's the observation**
18 **of -- of the inspector who, to my knowledge, was,**
19 **you know, not a geologist or -- or a soil**
20 **scientist.**

21 **I see that -- I saw that citation.**
22 **There is sand in this material. There are sand**
23 **size grains in this material. So from that**
24 **perspective, I look at that as -- as a qualitative**
25 **observation. What we were talking about earlier**

1 **is the, really, the relative abundance of sand**
2 **size particles versus other sizes.**

3 Q But you didn't conduct any independent
4 analysis with respect to particle size, correct?

5 MR. McCLAIN: Independent analysis? I
6 object to form of the question.

7 BY MR. McGAHREN:

8 Q Independent analysis of Dr. Till and his
9 team.

10 A **The -- the independent analysis I**
11 **undertook was to look for myself in the historical**
12 **record for actual measurements that one could use,**
13 **and I -- I didn't find any. To my knowledge,**
14 **there -- they weren't taken.**

15 Q You did review records about who moved
16 the material from SLAPS to Latty Avenue, correct?

17 A **Yes.**

18 Q Was that Cotter?

19 A **To my knowledge, that was not Cotter.**

20 Q Was Cotter the licensee with respect to
21 that material when it was moved?

22 A **When it was moved, no, it's -- it's my**
23 **understanding they were not the licensee.**

24 Q Okay. So is it fair to say that Cotter
25 had nothing to do with any releases that occurred

1 at SLAPS or when that material was being
2 transported -- loaded and transported from SLAPS
3 to Latty Avenue?

4 MR. McCLAIN: Object to the form of the
5 question, calls for a legal conclusion.

6 THE WITNESS: I think that does call for
7 a legal conclusion. You'll see in my allocation
8 scheme, I -- I in fact do not allocate
9 responsibility for releases to Cotter for the
10 period of time when the wastes were solely on
11 SLAPS.

12 BY MR. McGAHREN:

13 Q And is that because you found no
14 involvement by Cotter?

15 A I didn't look for any involvement of
16 Cotter, but I didn't -- I'm not aware of any on
17 the SLAPS site.

18 Q You didn't find any, correct?

19 A Correct.

20 Q Whether you looked or not, you don't
21 have anything, correct?

22 MR. McCLAIN: Hold on. Object to the
23 form of the question. If he didn't look for it,
24 he wouldn't have anything.

25 THE WITNESS: Well, I guess it kind of

1 depends on what involvement means. I mean at some
2 level there's involvement because the -- the
3 material was originally at SLAPS, and Cotter was
4 involved with processing and handling of that very
5 same material. But I'm -- I don't believe that
6 Cotter operated SLAPS or operated at SLAPS.

7 BY MR. MCGAHREN:

8 Q Do you have any information to suggest
9 that any Cotter or -- any representative of Cotter
10 or contractor of Cotter was ever on SLAPS?

11 A I don't think I would know that. I
12 don't have any information about that.

13 Q But there was an initial license
14 represented today from 1963, correct?

15 A Correct.

16 Q And which company was that?

17 A I think this was Continental Mining and
18 Milling.

19 Q Did you consider them in your
20 allocation?

21 A I did not.

22 Q Why not?

23 A Well, because what I was requested to do
24 is, is provide an allocation scheme for the two
25 different sites and to assume that the parties

1 involved, since they were operating on -- on these
2 respective sites, that they could be responsible
3 for all of those releases. So that was kind of an
4 assumption that I was asked to make going into
5 this analysis.

6 Q So counsel directed you to do that,
7 correct?

8 A That was -- that was an assumption that
9 counsel asked me to make.

10 Q So my -- the answer to the prior
11 question is "yes," correct?

12 A That's correct.

13 Q Do you think that's fair?

14 MR. McCLAIN: Object to the form of the
15 question.

16 THE WITNESS: Well, I'm not -- I'm not
17 an expert on fairness. I also know from, you
18 know, more than 25 years of experience that a lot
19 of these environmental rules aren't fair. So I
20 didn't -- I don't have an opinion about fairness.

21 BY MR. MCGAHREN:

22 Q What are the Gore factors called?

23 A What are they called?

24 Q Yes.

25 A I call them the Gore factors.

1 Q What are they, though, in the context of
2 the CERCLA statute?

3 A Well, they're -- as I say in my report,
4 they're -- they're actually not contained in the
5 CERCLA statutes.

6 Q They're contained in the legislative
7 history, correct?

8 A That's correct. That's my understanding
9 of that.

10 Q And they were suggested by a
11 representative of Al Gore at the time, correct?

12 A That's correct.

13 Q And they were considered to be included
14 in the statute as equitable factors, correct?

15 A I really don't know about the
16 legislative history. What I -- what I know is
17 that subsequently folks in my profession have come
18 to use the Gore factors as a tool for trying to
19 allocate responsibility at contaminated sites.

20 Q And you only relied on one, correct, the
21 first one?

22 A That's right.

23 Q The degree of involvement of the party,
24 correct?

25 A Well, yeah, that's correct.

1 Q Okay. And in your analysis using
2 equitable factors suggested by former
3 Representative Gore, you did --

4 MR. McCLAIN: Former Vice President.

5 MR. MCGAHREN: I'm referring to what he
6 was at the time. He was also a former
7 Representative.

8 MR. McCLAIN: And he was elected
9 President, but that's beside the point.

10 BY MR. MCGAHREN:

11 Q Well, let me -- let me ask the question
12 again.

13 You -- you did not consider the degree
14 of involvement of parties who also handled these
15 materials and caused releases. Correct?

16 A Well, no, I -- I believe I did
17 incorporate degree of involvement. The -- the
18 amount of time that the waste piles were present
19 on each site is -- as I state in my report, is a
20 proxy for degree of involvement.

21 Q Did you consider the degree of
22 involvement of the United States Atomic Energy
23 Commission?

24 A No, I didn't.

25 Q Did you consider the degree of

1 involvement of the Army Corps of Engineers
2 Manhattan District?

3 **A** **No. I was asked to make an assumption**
4 **that the parties in this case, Mallinckrodt and**
5 **Cotter, were or could be considered responsible**
6 **for the entire allocation from the respective**
7 **sites.**

8 **Q** **And do CERCLA allocations that utilize**
9 **Gore factors consider orphan parties?**

10 **A** **They can. I mean, you know, I think, as**
11 **you probably know, there -- there isn't exactly**
12 **strict regulatory guidance on how to apply the**
13 **Gore factors. So really, I look at the Gore**
14 **factors and -- and other forms of allocation as**
15 **tools that you can use and apply to different**
16 **sites, taking into consideration what kind of**
17 **information is -- is achievable and what kind of**
18 **information is -- is lost.**

19 **Q** **But there were other parties who were**
20 **involved with these materials for whom you didn't**
21 **consider their degree of -- of involvement,**
22 **correct?**

23 **A** **I understand that. I was not asked to**
24 **evaluate their degree of allocation or**
25 **involvement.**

1 Q You testified earlier about the fact
2 that you don't know how samples were analyzed for
3 concentrations of radionuclides in water in 1948,
4 correct?

5 A I think what we were specifically
6 talking about is filtering out of sediments.

7 Q In your experience, when did filtration
8 of water samples become an issue?

9 A Well, this predates my experience, but
10 my understanding of the field is that as long
11 as -- as soon as folks came to understand that
12 there could be contamination partitioned into both
13 water and/or sediments, that filtration became an
14 issue, and that the -- the general standard
15 protocol when you're collecting a water sample is
16 to collect only the water.

17 As a matter of fact, I mean this is
18 modern times, but we even have guidelines for
19 monitoring wells that even before they're
20 filtered, they shouldn't be too sediment laden.

21 Q Now, the standard protocols that you
22 just testified about, whose standard protocols are
23 they? EP -- EPA's?

24 A That's correct.

25 Q Okay. When was EPA -- when did EPA come

1 into existence?

2 **A** Oh, gosh. Well, EPA came into existence
3 in about 1970.

4 **Q** I believe it was 1972, but --

5 **A** Okay.

6 **Q** -- roughly around the same time.

7 **A** Yeah.

8 **Q** So EPA's protocols didn't even exist
9 back when these samples were being analyzed,
10 correct?

11 **A** That's correct. But it's my
12 understanding that as long as environmental
13 samples of water have been taken, there's been an
14 understanding that that's two different things:
15 Collecting an unfiltered particle laden sample
16 versus a sample that contains only water that is
17 either filtered or comes from, say, a water body
18 like the ocean that probably doesn't have any
19 sediment laden in it.

20 **Q** But sitting here today, you don't know
21 whether the samples that you testified about
22 earlier from 1948 and 1960 were filtered or
23 unfiltered samples, correct?

24 **A** That's right. And I -- and I, you know,
25 discuss that as -- as an unfortunate uncertainty.

1 Q You referred to ALARA a number of times
2 in your testimony today, correct?

3 A Yes.

4 Q When did that acronym come into being?

5 A I don't know exactly when it came into
6 being, but it's incorporated into the federal code
7 by 1960.

8 Q Which federal code?

9 A You'll find language like -- speaking
10 about ALARA in 10 CFR Section 20.

11 Q In what year?

12 A I believe as early as 1960.

13 Q The word "ALARA" appears in 10 CFR
14 Part 20 in 1960; is that correct?

15 A Well, I can't say for sure that they use
16 that acronym, but that term is used. It's used as
17 a description of kind of the -- the basis or the
18 desire of the subsequent quantitative effluent
19 limitations.

20 Q Sitting here today, though, you can't
21 tell me when that term was coined in federal
22 regulations and where it appeared, correct?

23 A That's right, I don't know exactly when
24 it appeared.

25 Q You can't even tell me which agency

1 coined it, can you?

2 **A No, I can't.**

3 Q Now, you testified earlier about the
4 fact that you used a single data point max
5 concentration in your calculations, correct?

6 **A Which calculations are we discussing?**

7 Q I believe there were calculations that
8 you were referring to with respect to uranium data
9 at SLAPS.

10 **A Yes, I believe that's correct.**

11 Q You would agree, though, that the
12 regulations that existed at the time allowed
13 licensees to use annual averages, correct?

14 **A Once again, I -- I agree that that's**
15 **what the language says, that averages of no**
16 **greater than a year may be used.**

17 Q Environmental data tends to be variable,
18 correct?

19 **A Yes, it does.**

20 Q Okay. Don't average concentrations
21 factor that in?

22 **A That's one of the things -- one of the**
23 **reasons we use averaging. But once again, there**
24 **has to be enough data -- we call that,**
25 **statistically speaking, a sample -- to be actually**

1 **representative of the population. And by**
2 **population, we mean the -- the sort of**
3 **impossible-to-achieve analysis of every single**
4 **moment. So there has to be a big enough dataset**
5 **in order to calculate a mean.**

6 Q Says who?

7 A **Well, that's just statistical practice.**

8 Q Well, I'm not talking about statistical
9 practice. I'm talking about the regulations in
10 10 CFR Part 20. Do you see that anywhere in those
11 regulations?

12 A **No, I don't, but, you know, the term**
13 **"average" is intrinsically statistical.**

14 Q So if I have -- Mallinckrodt had six
15 samples that you were looking at earlier, correct?

16 A **That's correct.**

17 Q The regulations would explicitly allow
18 Mallinckrodt to use the average of those six
19 samples, correct?

20 MR. McCLAIN: Object to the form of the
21 question.

22 THE WITNESS: I don't really have an
23 opinion about that. I mean, it does allow the use
24 of averages. I would contend that that's not
25 enough data to be representative of an average,

1 but other people might have different opinions.

2 BY MR. McGAHREN:

3 Q Can't you have an average of two
4 numbers?

5 A Well, you've got to think about what the
6 purpose of an average is. The purpose of an
7 average is to say something meaningful about the
8 real world, about -- about the truth. And if you
9 have a variable -- if you have a variable thing
10 that you're trying to measure -- we just talked
11 about how a lot of this environmental data is
12 quite variable. If you have a lot of variability
13 in your dataset, you need a lot of data in order
14 to collect a reliable average that's reasonably
15 representative of the truth.

16 So, let's take an example. If we go to
17 Alaska, and I measure the temperature on
18 December 3rd and then again on December 5th, and
19 take the average, that's not going to be a very
20 representative average annual temperature in
21 Alaska, because I missed the summer. What you
22 would need is a measurement every day or at least
23 every week in order to have a reasonable average
24 estimate for a dataset that's highly variable.

25 Q Do you know if the current -- under the

1 current NRC regulations, licensees are allowed to
2 use average data?

3 **A I believe that language is still in**
4 **there, yes.**

5 Q Where is it, do you know?

6 **A I think it's still in 10 CFR Section 20.**

7 Q You're certain it was in 1960, though,
8 correct?

9 MR. McCLAIN: Object to the form of the
10 question. He said he thought.

11 BY MR. MCGAHREN:

12 Q Let me -- let me rephrase the question.
13 Is it your testimony that the 1960 regulations
14 allowed annual averages in calculating effluent
15 exceedances? Yes or no?

16 MR. McCLAIN: Well, he doesn't have to
17 answer it yes or no. It can be "I don't remember"
18 or it can be "I'd have to look." He doesn't have
19 to answer "yes" or "no."

20 MR. MCGAHREN: Nice job coaching, Ken.

21 MR. McCLAIN: Well, I mean, it gets
22 tiresome when you give directions to witnesses
23 that don't have to be followed.

24 THE WITNESS: Well, it's not really my
25 testimony, but I -- I do understand that that

1 language was in the code in 1960.

2 BY MR. McGAHREN:

3 Q But you disagree with it?

4 A No, I don't disagree with it. It -- it
5 says averages may be utilized.

6 So there's two points to that. One is
7 averages don't have to be utilized. And the
8 second one is, I read into the reference to an
9 average that the average needs to be reliable, so
10 there needs to be enough data to reliably collect
11 an average or calculate an average.

12 Q You didn't look at metals in terms of
13 doing any calculations or analyses other than
14 metals that happen to be radionuclides in this
15 particular report that you prepared?

16 A I did look at metals. They're not
17 described in this report because I was asked to
18 provide opinions that were specifically relevant
19 to the judge's scheduling order, and that -- that
20 wasn't talking about metals.

21 Q Do you have opinions with respect to
22 exposures of any of these four plaintiffs to
23 metals other than radionuclides?

24 A I actually don't render opinions about,
25 you know, exposures. So the answer is no.

1 Q Okay, let me rephrase the question. I'm
2 glad you clarified that.

3 Do you provide any calculations or do
4 you quantify in any way metals concentrations in
5 air or other media in your report?

6 **A Other than the radionuclides that we've**
7 **talked about --**

8 Q Correct.

9 **A -- the answer is no.**

10 Q Okay. Do you have opinions about that
11 at this time?

12 **A I don't have any formal opinions. I**
13 **mean, it's possible that I could be asked about**
14 **the fate and transport of metals. I have studied**
15 **the historical record about metals at these sites.**
16 **I know that they've been -- a handful of metals**
17 **have been named as constituents of concern.**

18 **I also recognize that they are generally**
19 **not the -- considered to be the risk or cleanup**
20 **drivers. So I don't have any --**

21 MR. MCGAHREN: I'd like to strike
22 that -- move to strike that answer as
23 nonresponsive.

24 BY MR. MCGAHREN:

25 Q I asked you if there were any

1 calculations or did you in any way quantify
2 concentrations of metals other than radionuclides
3 in your reports.

4 **A No, I didn't.**

5 Q Your second opinion, at page 10 of
6 Exhibit 2, reads: "Contamination, including
7 radiologic materials and metals, has escaped from
8 the landfill."

9 What landfill are you referring to? Are
10 you referring to the buried demolition material on
11 SLAPS?

12 MR. ZAGER: Object to the form.

13 THE WITNESS: Gosh, I -- I've never
14 noticed that before, and I just have to
15 acknowledge that that's -- that's a typo. What I
16 meant there is the waste piles.

17 BY MR. MCGAHREN:

18 Q Were you hired for the West Lake case
19 first or for these four McClurg plaintiffs first?

20 **A I was retained for the West Lake case**
21 **first.**

22 Q Okay. So is this possibly a relic from
23 your West Lake report?

24 **A I'm afraid it might be, and I apologize**
25 **for that. That's not what I meant to say.**

1 Q Okay. I just wanted to be clear what
2 you were referring to. So there your testimony is
3 you're referring to the waste piles?

4 **A Correct.**

5 Q And you're referring to waste piles at
6 SLAPS and Latty Avenue; is that correct?

7 **A In opinion 2?**

8 Q Yes.

9 **A Yes.**

10 Q Did you quantify any concentrations of
11 radionuclides in media other than air?

12 MR. McCLAIN: Can I have that question
13 back?

14 (Whereupon, the requested record
15 was read.)

16 THE WITNESS: I have a table that
17 quantifies some concentrations in water, so I -- I
18 did some quantitation of concentrations in water.

19 BY MR. McGAHREN:

20 Q Can you point me to that table?

21 **A Yeah.**

22 Q Is it in Exhibit 2?

23 **A Yes. Let's see. It's Table 1.**

24 Q Table 1. What you were testifying about
25 earlier.

1 **A Yes.**

2 Q Okay. Is that the only place you did
3 any kind of quantification of radionuclides in the
4 media other than air?

5 **A There is a discussion in the text that**
6 **we talked about earlier about the uranium**
7 **measurement, the total uranium measurement in**
8 **water. I don't think I'd call that quantifying**
9 **because I'm just reporting, you know, data**
10 **collected by others. So with -- if we add that**
11 **discussion in the text, then that's it.**

12 Q Let's refer you to Table 1, the
13 thorium-230 which you describe as soluble. And
14 over on the right side, you report the max
15 concentration reported in near offsite surface
16 water, picocuries per liter source.

17 The source refers to the source of the
18 information; is that correct?

19 **A Correct. That's really a separate**
20 **column.**

21 Q Okay. Now looking at the thorium-230
22 row, your max concentration is "non-detect,"
23 correct?

24 **A That's correct.**

25 Q So there were no detections of thorium

1 that you were able to find in surface water,
2 correct?

3 **A Of thorium-230, that's -- that's**
4 **correct.**

5 Q Do you know where the max U-238 sample
6 was collected?

7 **A I don't -- I don't recall specifically**
8 **where it was collected, but it was close to but**
9 **downstream of the SLAPS site.**

10 Q So is it fair to say that these max
11 numbers for U-238 and radium-226 pertain to SLAPS
12 and not Latty Avenue?

13 **A I didn't make that kind of evaluation,**
14 **so I -- I really don't have an opinion like that**
15 **in this report.**

16 Q Does the water flow -- Coldwater Creek
17 water flow from SLAPS toward Latty Avenue?

18 **A It does.**

19 Q So Latty Avenue is downstream?

20 **A It is.**

21 Q And your sources say for U-238, you
22 identify source D, which is DOE radiological
23 survey at a St. Louis Airport site, and you were
24 presented with that report today in your
25 testimony, correct?

1 **A Correct.**

2 Q That doesn't pertain to Latty Avenue,
3 correct?

4 **A The 1979 survey?**

5 Q Correct.

6 **A No, it doesn't.**

7 Q It's for SLAPS, right?

8 **A Right.**

9 Q Okay. And the same thing for your
10 radium-226 max sample, that's a Bechtel report for
11 the SLAPS site, correct?

12 **A That's correct.**

13 Q So that number doesn't pertain to Latty
14 Avenue, correct?

15 **A Well, that number is -- certainly that**
16 **concentration was -- that sample was collected**
17 **closer to the SLAPS site.**

18 Q Upstream of the Latty Avenue site,
19 correct?

20 **A I believe it was.**

21 Q Can I refer you to page 3 of your
22 report.

23 **A Yeah.**

24 Q In the Summary of Opinions, you say:
25 "Previous studies in modeling predictions have

1 shown the transport by windblown dust, transport
2 of radon gas and air, surface water sediments,
3 sediment transport. And groundwater flow are all
4 proven pathways for contamination to escape into
5 the environment."

6 To what studies are you referring?

7 **A I am referring to really the totality of**
8 **studies that have been conducted, starting all the**
9 **way back in 1948, the work that was done on behalf**
10 **of Oak Ridge in the '60s, and then the work that**
11 **was also done and documented in Army Corps of**
12 **Engineer reports, in more recent era under the**
13 **FUSRAP program.**

14 Q Including ones that aren't identified in
15 your report?

16 **A No.**

17 Q So only the ones that are identified in
18 your report.

19 **A I'm pretty sure that the documents that**
20 **I rely upon for these opinions are cited in the**
21 **report.**

22 Q Which of these path- -- pathways have
23 you confirmed in your report?

24 **A Well, first of all, I'll say that that**
25 **wasn't my objective necessarily to confirm all**

1 these pathways, but I have confirmed discharges
2 to -- to surface water, to surface water
3 sediments, and discharges by airborne particulate
4 transport, and transport of radon gas. I think
5 that's about it.

6 Q Have you -- strike that.

7 For which properties and plaintiffs at
8 issue in this matter do you believe these pathways
9 are complete?

10 A I believe these pathways -- well, by
11 complete, I think what we're talking about is
12 offsite impacts. Is that what we're talking about
13 by complete pathways?

14 Q Or exposure to the plaintiffs.

15 A I don't -- I don't have opinions about
16 exposure to the plaintiffs.

17 Q Well, I'm not asking about the level of
18 exposure. I'm talking about the pathway of
19 exposure. Do you have opinions on that?

20 A I have -- I mean, I -- I'm not trying to
21 be difficult, but I just want to be really clear.

22 You know, you won't see in this report
23 what we might call exposure point concentrations
24 that would be used in -- in a risk evaluation.
25 What -- what I'm really looking at is the nature

1 of historical discharges across the property line.

2 So I really haven't quantified exposure point
3 concentrations.

4 Q Okay. The only thing that you have
5 quantified then are effluent concentrations for
6 air at the property line; is that correct?

7 A I've also quantified --

8 Q No, that's -- you're not answering my
9 question, sir. I'm not asking also.

10 I'm asking, is the only thing you
11 quantified exposure concentrations at the fence
12 line in air?

13 A No.

14 Q No. You tell me then.

15 A Okay. I've also quantified based on
16 available data surface water discharge
17 concentrations.

18 Q And that was Table 1.

19 A And that was Table 1.

20 Q But you haven't done for that Latty
21 Avenue, correct?

22 A That's correct, I haven't done that --
23 well, I actually haven't done that in -- in a way
24 that would specifically identify Latty Avenue
25 versus SLAPS.

1 Q You don't have any data or analysing --
2 analysis in your report to quantify impacts on the
3 plaintiffs' properties; is that correct?

4 A **That's correct.**

5 Q Do you know when Cotter became an AEC
6 licensee?

7 A **I -- I don't know the exact date, but it**
8 **was late 1960s, I think.**

9 Q Do you know if Cotter operated the dryer
10 before 1970?

11 A **I don't believe that Cotter was --**
12 **Cotter employees were directly operating the dryer**
13 **before 1970.**

14 Q Did Cotter have any on-site involvement
15 before 1970? Do you have any information on that?

16 A **What I have information on -- I don't**
17 **have any information on -- on their on-site**
18 **activities. I know that they were involved from**
19 **the beginning because they were receiving the**
20 **waste.**

21 Q What do you mean they were involved from
22 the beginning? Were they involved in 1963?

23 A **No, they were involved from 1966, when**
24 **it was anticipated that they would be receiving**
25 **these wastes for reprocessing.**

1 Q What information do you have that
2 suggests that they were anticipated to receive
3 this material in 1966?

4 **A I -- I recall reading that in one of the**
5 **historical summaries.**

6 Q Do you know if the 1963 license
7 contemplated a processing plant by the licensee?

8 **A Well, let's look at it. I -- you know,**
9 **I --**

10 Q We have the --

11 **A I said earlier that I -- I didn't review**
12 **the licenses.**

13 Q You don't think that was important? You
14 didn't review the licenses, but you're opining on
15 standard of care with respect to the licenses; is
16 that correct?

17 **A I'm opining on standard of care with**
18 **respect to the handling of hazardous materials.**

19 Q But isn't the license the governing
20 document for the handling of the materials during
21 these operations?

22 **A Well, the -- the license ensures that**
23 **any standard of care that would be found in 10 CFR**
24 **Section 20 would apply. But, you know, these**
25 **licenses are -- are very brief. They don't --**

1 **they don't spell out complete standard of care.**

2 Q Do you have the 1963 license in front of
3 you?

4 **A Let's see. (Peruses document.)**

5 **Okay, I do.**

6 Q Which exhibit --

7 **A It's Exhibit 5.**

8 Q Exhibit 5. Thank you.

9 And who was the licensee in Exhibit 5?

10 **A The licensee is Contemporary Metals**
11 **Corporation.**

12 Q And did you have -- do you have
13 information that suggests there was any
14 relationship or connection between Contemporary
15 Metals Corporation and Cotter?

16 **A I don't have any specific information**
17 **about what their relationship might be. I know**
18 **that Cotter was the recipient of most of the**
19 **material from Latty Avenue, but I don't know the**
20 **nature of their relationships.**

21 Q Okay. Could you describe for me the
22 licensing process that AEC utilized at the time
23 frame when this license was applied for?

24 **A No, I can't really.**

25 Q Do you know if it involved an

1 application?

2 **A Yes, it did involve an application.**

3 Q Did you review the application for the
4 '63 license?

5 **A No, I didn't.**

6 Q Did you review the application for any
7 of the subsequent licenses for material at Latty
8 Avenue?

9 **A No.**

10 Q Do you know if those applications
11 provided procedures and health and safety
12 parameters to the AEC?

13 **A I -- I didn't review them, so I don't
14 know what their contents are.**

15 Q So let me just understand this.
16 You are opining on the standard of care,
17 but you don't know the AEC licensing process, you
18 didn't review the applications that were submitted
19 to AEC, and you didn't even review the licenses,
20 correct?

21 **A That's correct.**

22 Q All right. Who was the next licensee
23 after this 1963 license?

24 **A Well, I -- I know the -- the
25 predecessors to Cotter changed names or there were**

1 **different companies, but I don't recall the names.**

2 Q Do you use that "predecessor" word in
3 some sentence if there's an affiliation between
4 Cotter and any of these prior licensees?

5 A **I'm -- I'm just talking about temporal,**
6 **you know, sequencing.**

7 Q Okay. So there's no legal significance
8 to that word there. You're just using it in a
9 temporal sense, correct?

10 A **I am.**

11 Q Okay. You don't know who the other
12 licensees were?

13 A **I don't recall their names as I sit**
14 **here.**

15 Q Did you evaluate any documentation
16 concerning their operation of Latty Avenue?

17 A **Well, I know that -- that these**
18 **companies prior to Cotter assuming the license**
19 **were involved with the operation of Latty Avenue.**
20 **So from the context of reviewing inspection**
21 **reports and reviewing historical information about**
22 **the operation, that would fall into that category.**

23 Q I'm not sure I understand your -- your
24 answer.

25 MR. McGAHREN: Can you read back that

1 answer? Read the question and the answer, please.

2 (Whereupon, the requested record
3 was read.)

4 BY MR. MCGAHREN:

5 Q Did you find anything in your review
6 that connected any of these prior licensees to
7 Cotter?

8 A I don't have any knowledge of -- of
9 contractual arrangements, but it's my
10 understanding that Cotter was the receiver of
11 these wastes as they were being shipped out of
12 Latty Avenue, even before Cotter took over the
13 operation of Latty Avenue.

14 Q When were the first materials shipped
15 out of Latty Avenue?

16 A I might not recall exactly, but it would
17 have been approximately, as I recall the
18 documentation, 1968.

19 Q And do you know the entity that was
20 shipping that material?

21 A No, I don't.

22 Q Do you know if they were a licensee?

23 A Well, I believe they were.

24 Q Do you know if they were inspected by
25 the Atomic Energy Commission?

1 **A** Well, we have some -- we have some
2 documentation of some inspections, so it's my
3 belief that they were on occasion inspected by
4 **AEC.**

5 **Q** Can I refer you to page 11 of your
6 report.

7 **A** **Yeah.**

8 **Q** In the middle of -- at page 11, you say:
9 "Mallinckrodt would have been aware of this issue
10 because AEC had observed and reported uncontrolled
11 releases of contaminated sediment at least by
12 1948."

13 What are you referring to specifically
14 that Cotter would have been aware of?

15 **MR. ZAGER:** Object to form. You just
16 mentioned Mallinckrodt there.

17 **MR. MCGAHREN:** I read the sentence. My
18 question did not use the word "Mallinckrodt."

19 **THE WITNESS:** I -- I think it did.

20 **MR. MCGAHREN:** Read back the question.

21 **BY MR. MCGAHREN:**

22 **Q** I'm pointing you to a sentence you wrote
23 which uses the word "Mallinckrodt."

24 **A** **I -- I think you didn't read that**
25 **exactly correctly.**

1 Q Well, let me rephrase the question.

2 A Okay.

3 Q Do you see the sentence I'm referring
4 to? It says --

5 A I do.

6 Q -- "Mallinckrodt and Cotter would have
7 been aware of this issue."

8 A Yes.

9 Q What are you referring to that Cotter
10 would have been aware of?

11 A What I'm referring to is contamination
12 in creek sediments.

13 Q Because of this 1948 report?

14 A That's an example of -- of knowledge of
15 this situation of offsite transport of
16 contaminants.

17 Q Can we pull out that 1948 report? I
18 believe it's Exhibit 7.

19 That's the only report you reference to
20 support your statement that Cotter would have been
21 aware of it, correct?

22 A That's the only report that I'm
23 referencing, yeah.

24 Q Okay. And that report was drafted by
25 the Atomic Energy Commission?

1 **A That's correct.**

2 Q Okay. Take a look at the front -- the
3 first page of Exhibit 7. Do you see at the
4 bottom?

5 **A Yes.**

6 Q What does it say?

7 **A It says "Confidential."**

8 Q "Confidential." Do you know -- it says
9 in the middle here, "Declassified." Do you see
10 that?

11 **A I do.**

12 Q It was a classified document. How --
13 how can you be certain Cotter could have known
14 anything about this document?

15 **A Well, I don't have direct knowledge that**
16 **Cotter would have known about this specific**
17 **document, but it's kind of -- it's kind of common**
18 **sense, I mean when -- when we see evidence that**
19 **material is escaping from these sites -- for**
20 **example, at the SLAPS site we have this evidence**
21 **reported in 1948. We have later evidence showing**
22 **that steps were actually taken to prevent sediment**
23 **from escaping that site. When at the Cotter site,**
24 **we have situations where, you know, waste material**
25 **is -- is just visually observed to be sloughing**

1 **under fences and things like that, that there's a**
2 **common sense element that folks would have**
3 **recognized that contaminated material was**
4 **escaping.**

5 Q And what exactly did Cotter do here? To
6 your knowledge. Did they remove material from the
7 site?

8 A **Well, Cotter at first received materials**
9 **from the site.**

10 Q For what purpose?

11 A **For the purpose of reprocessing.**

12 Q So they were looking to recover material
13 from these wastes, correct?

14 A **That's my understanding, in Canon City,**
15 **Colorado.**

16 Q Essentially they were recycling the
17 materials, correct?

18 A **That's one way to talk about it. They**
19 **were -- they were "reclaiming" is a -- is a**
20 **term --**

21 MR. McCLAIN: Trying to make money.

22 THE WITNESS: -- that we often use.

23 Yeah, they were --

24 MR. McCLAIN: They were trying to make
25 money.

1 THE WITNESS: They were -- they were
2 extracting value out of these wastes because they
3 still contained, you know, pretty sizable levels
4 of uranium.

5 And then starting about 1970, they
6 operated the site.

7 MR. McGAHREN: I -- I didn't want to
8 interrupt your answer there.

9 But, Ken, that was probably the worse
10 example of coaching that I've ever witnessed in
11 30 years as a lawyer. Please don't do that again.
12 Thank you.

13 BY MR. McGAHREN:

14 Q So --

15 MR. McCLAIN: Suggesting that they were
16 trying to make money is coaching him? Isn't that
17 true? It's absolutely true. All the evidence in
18 the case are contracts back and forth about how
19 much money Cotter was going to make reprocessing
20 this information. I don't think I was coaching
21 him at all. It's just stating a fact that's not
22 in dispute.

23 MR. McGAHREN: The witness was in the
24 middle of answering my question.

25 MR. McCLAIN: And he did.

1 MR. McGAHREN: It was inappropriate.

2 BY MR. McGAHREN:

3 Q Do you have any knowledge of the
4 contractual arrangements between Cotter and any
5 other licensee of the Latty Avenue site?

6 A I think we covered that before. I don't
7 have any knowledge of the contractual arrangements
8 between the parties.

9 Q So you didn't consider that in forming
10 your opinions?

11 A No.

12 Q Okay. You refer on page 11 of your
13 report to "a troubling record of contaminated soil
14 apparent -- apparently being used to build a ramp
15 into a parking garage at the St. Louis Airport."

16 Do you see that?

17 A Yes.

18 Q Are you referring to Cotter there?

19 A I'm not really referring to anyone. To
20 my knowledge -- specifically. To my knowledge,
21 there isn't any record of an investigation as to
22 how this event came about. So I'm not allocating
23 any blame or responsibility. I'm just pointing
24 out that this is the kind of thing that can happen
25 when you look at uranium mine tailing sites. It's

1 something that's -- that's found at uranium mine
2 tailing sites.

3 So I'm not incorporating that into any
4 kind of allocation. I'm just citing it as an
5 example whereby it appears that some of this
6 material was used in a construction project.

7 Q From the airport site, correct?

8 A I don't know where it's from.

9 Q Well, doesn't this refer, the reference
10 at footnote 29, "Letter to St. Louis Airport
11 Authority"?

12 A Well, the parking garage is at the
13 airport site, but as to where the fill material
14 came from, I -- I'm not aware that anyone tracked
15 that down.

16 Q Did you evaluate the operations of the
17 airport itself in decommissioning the St. Louis
18 Airport Site?

19 A No, I didn't.

20 Q You didn't. Do you consider that
21 relevant to your opinions?

22 A For the assignment that was presented to
23 me, that was not relevant.

24 Q Why not?

25 A Well, for the purposes of allocation, I

1 think I've already mentioned this, that I was
2 asked to evaluate the allocation for offsite
3 releases from the various sites, assuming that
4 Cotter and Mallinckrodt having operated it at
5 their respective sites could be considered
6 responsible for all of the releases from those
7 respective sites.

8 Q Can your report be used to evaluate
9 concentrations experienced by the plaintiffs in
10 this case?

11 MR. McCLAIN: Object to the form of the
12 question. By whom?

13 THE WITNESS: I think we already talked
14 about that too. Can it be used? It -- it
15 probably could be used to evaluate the
16 concentrations that were experienced by the
17 plaintiffs. I didn't do that, and to my
18 knowledge, Dr. Clark didn't either.

19 BY MR. McGAHREN:

20 Q Did Dr. Clark do his own independent
21 assessment of exposure concentrations?

22 A Yes.

23 Q Did you review that?

24 A I did review his reports, yes.

25 Q Did you reach any opinions based on his

1 reports?

2 **A** Can you clarify that? I'm not sure what
3 you mean. Are you asking about the opinions that
4 are stated in my report having flowed from
5 Dr. Clark's or is it something broader?

6 **Q** I'm -- I'm talking about, you know,
7 information from Dr. Clark's report or opinions
8 from his report, have they caused you to form any
9 new opinions?

10 **A** No, they -- they reinforced my opinions
11 that -- that there's offsite contamination that --
12 you know, that was caused by releases from the
13 SLAPS site and the Latty Avenue site.

14 I discussed earlier that I did review
15 three of Dr. Clark's reports. I came to
16 understand the methodology that he used for
17 arriving at those exposure point concentrations,
18 and I believe that that was an appropriate and
19 reasonable approach that he took.

20 **Q** Do you consider yourself an expert with
21 respect to AEC regulations?

22 **A** I don't specifically consider myself an
23 expert with respect to AEC regulations, but I do
24 consider myself an expert in interpreting
25 environmental regulations and applying those

1 **regulations on behalf of clients at sites.**

2 Q What's your experience with AEC
3 regulations?

4 A Well, this is the -- this is I think the
5 **first project where I've applied AEC effluent**
6 **limitation regulations.**

7 Q First ever, correct?

8 A Correct.

9 Q How about NRC regulations, are you an
10 expert with respect to NRC regulations?

11 A Once again, I'm not -- I'm not proposing
12 that I'm a specific expert on NRC regulations, but
13 through my 25-plus years of -- of work, I do
14 consider myself an expert at interpreting federal
15 and state environmental regulations, and helping
16 clients understand and comply with them.

17 Q In your report, you opine that it's the
18 1960 AEC regulations, 10 CFR Part 20, that apply
19 to Cotter's operation at Latty Avenue; is that
20 correct?

21 A Correct.

22 Q How did you reach that conclusion?

23 A Well, what we looked for was the
24 **earliest -- the earliest version of the**
25 **regulations that would apply during the '60s.**

1 Q Why would you look at the earliest?

2 Wouldn't you look at the regulations that were in
3 effect at the time the operations occurred?

4 A Well, I think they were in effect.

5 Q So it's your opinion and testimony that
6 it was the 1960 regulations that applied to
7 Cotter's operations at Latty Avenue, correct?

8 A Well, specifically in terms of these
9 effluent limitations, yes.

10 Q And not some subsequent regs, correct?

11 A That's correct.

12 Q Is that an opinion you reached on your
13 own?

14 A That's an opinion -- that's really an
15 assumption that I was given from counsel.

16 Q Do you know what part of the CFR
17 NRC regulations are contained in?

18 A No, I don't.

19 Q How about EPA regulations, do you know
20 what part of the CFR they're contained in?

21 A Those are generally contained in -- or
22 they are contained in 40 CFR.

23 Q So you're familiar with the EPA regs but
24 not the NRC regs?

25 MR. McCLAIN: Object to the form of the

1 question.

2 BY MR. McGAHREN:

3 Q Correct?

4 MR. McCLAIN: Object to the form of the
5 question.

6 BY MR. McGAHREN:

7 Q You can answer.

8 A I'm more familiar with the EPA
9 regulations, that's true.

10 Q Other than the 1948 AEC sampling report
11 and exhibits that you were shown earlier today in
12 your testimony, did you evaluate any offsite water
13 sampling done by Cotter or its consultants?

14 A I don't believe so.

15 Q How did you determine what to review?

16 A Well, I was first given and then my --
17 you know, then found on my own a -- a handful of
18 documents, such as more recent Army Corps of
19 Engineer reports. I reviewed early on the RAC
20 report, and those reports make references to
21 earlier documents.

22 So I kind of followed a chain of
23 becoming aware of the existence of certain
24 documents and then tracking them down.

25 Q But you didn't review any specific

1 documents concerning Cotter's sampling of water;
2 is that correct?

3 A I don't recall any -- any data of
4 Cotter's sampling of water.

5 Q You didn't review any, correct?

6 A I -- you know, as I sit here, you know,
7 there's thousands and thousands of pages. I
8 don't -- I don't recall any data like that.

9 Q If there was data like that, would it be
10 relevant to your opinion?

11 A Well, I'm a data guy. I -- you know, I
12 welcome getting more data, and -- and if there was
13 additional data that -- that would allow me or
14 suggest to me that I should refine an opinion, I
15 would be happy to do that.

16 You know, I'll point out that for the
17 purposes of -- of this report, I was looking at
18 comparing the concentrations that were known or
19 calculated with the effluent limitations, and what
20 I found was that I didn't have information that
21 the water effluent limitations were exceeded.

22 So, from -- from that perspective, I,
23 you know, made a conclusion, acknowledged that
24 there's a limitation in the data that's available,
25 and I moved on.

1 Q Did you make an effort to summarize all
2 available water sampling data from Coldwater Creek
3 prior to removal of the piles?

4 A I was -- I was interested in finding all
5 data from water sampling prior to removing the
6 waste piles. I can't say for certain that I found
7 all that data. I used the data that was available
8 to me to formulate these opinions.

9 Q And what data was available to you?

10 A The data that's cited in the references
11 in my report.

12 Q And where did you get that data?

13 A Well, once again, I retrieved a lot of
14 those reports myself from FUSRAP website, from the
15 EPA website, and then other data and reports I
16 retrieved from Humphrey Farrington's document
17 repository.

18 Q Do you have an index of what's on
19 Humphrey Farrington's document repository that you
20 reviewed?

21 A I'm not aware of any index.

22 Q Can I refer you to page 9 of your
23 report.

24 A I'm with you.

25 Q Okay. On page 9, you state that:

1 "Levels of contamination, principally thorium-230
2 similar to those on the piles, were found in both
3 areas."

4 Are you referring to the northern and
5 eastern vicinity areas or properties?

6 **A I'm just trying to find that sentence.**

7 **Oh, I see.**

8 **Well, this is the -- in reference to --**
9 **wait a minute. This is in reference to a study on**
10 **the Latty Avenue site.**

11 Q But that statement, "Levels of
12 contamination," you're referring to the northern
13 and eastern vicinity properties; is that correct?

14 **A I'm sorry, repeat the question.**

15 Q The sentence that I read that says:
16 "Levels of contamination, principal thor- --
17 principally thorium-230, similar to those on the
18 pile, were found in both areas," you're referring
19 to the northern and eastern vicinity properties;
20 is that right?

21 **A Correct. Correct.**

22 Q Did you review -- attempt to track back
23 in time the genesis of the soluble versus
24 insoluble effluent limits?

25 **A No, I -- I really didn't do that.**

1 MR. McCLAIN: You guys have to leave in
2 a half hour, don't you?

3 MR. McGAHREN: We'll get them out of
4 here, don't worry.

5 THE WITNESS: I don't want to gum
6 things up, but I'd appreciate taking a short break
7 when --

8 MR. McGAHREN: Let's take --

9 THE WITNESS: -- there's a good stopping
10 point.

11 MR. McGAHREN: Let's take a break now.
12 That's fine. I don't have that much more.

13 THE WITNESS: Okay.

14 THE VIDEOGRAPHER: Going off the record.
15 The time is 4:55 p.m.

16 (Recess.)

17 THE VIDEOGRAPHER: Going on the record.
18 The time is 5:01 p.m.

19 MR. McGAHREN: We're back on?

20 THE VIDEOGRAPHER: Yes.

21 BY MR. McGAHREN:

22 Q Dr. Clark, can you describe your
23 methodology for calculating air releases and
24 emissions of the fence line at Latty Avenue?

25 **A Yeah.**

1 **It's Dr. Wells.**

2 Q Pardon me. It's late in the day.

3 **A It is.**

4 Q Dr. Wells. Sorry. I got Clark on my
5 mind.

6 **A Good. Your question was describe the**
7 **methodology for estimating air emissions at Latty**
8 **Avenue?**

9 Q And effluent concentrations.

10 **A And effluent concentrations, yes.**

11 **So that's discussed in my report**
12 **starting on page 17, and I specifically looked at**
13 **emissions related to the waste drying operation.**

14 **And this is one of those examples where**
15 **Dr. Till's team had done some calculations that I**
16 **was able to, first of all, review and determine**
17 **that their methodology was reliable, and then use**
18 **to calculate or estimate the effluent**
19 **concentrations at the fence line.**

20 Q So you didn't do the underlying
21 calculations performed by Dr. Till and his team
22 that you relied on, correct?

23 **A I -- I did a number of calculations, but**
24 **I did not -- I did not redo Dr. Till's**
25 **calculations.**

1 Q You testified earlier that your copy of
2 Dr. Till's report did not have the appendices,
3 correct?

4 **A At least it didn't have all the**
5 **appendices, I believe.**

6 Q Well, we've marked your report for
7 identification -- or, excuse me, we have not
8 marked Dr. Till's report. Let's do that.

9 (Exhibit No. 15 was marked for
10 identification.)

11 BY MR. MCGAHREN:

12 Q So I've marked the report for
13 identification as Exhibit 16 -- 15.

14 Is that the report you utilized?

15 **A Yes, it certainly looks like it.**

16 Q Okay. And where did you get a copy of
17 that report?

18 **A I got a copy of that report from**
19 **counsel.**

20 Q And do you know if that was -- report
21 was obtained by counsel off of the court's docket?

22 **A I really don't have any knowledge of**
23 **how -- how Humphrey Farrington came to have this.**

24 Q Well, looking at that report that I've
25 marked for identification as Exhibit 6 -- 15,

1 excuse me, did you have anything beyond what's in
2 that exhibit?

3 **A** Well, the version you just gave me is
4 like 300 pages long, so I -- you know, I certainly
5 can't go through and verify that it's exactly the
6 same, but I mean, I can certainly verify that it's
7 the same report that I used.

8 **Q** Is it the same thickness roughly as the
9 document you recall reviewing?

10 **A** I honestly never printed this report
11 out.

12 **Q** Okay. Let's go to the table of contents
13 of Exhibit 15.

14 **A** Sure.

15 MR. ZAGER: 15 or 16?

16 MR. MCGAHREN: 15. I said 16, but
17 it's 15.

18 BY MR. MCGAHREN:

19 **Q** Do you see the appendices there
20 identified in the table of contents?

21 **A** Yes, I do.

22 **Q** Which of those appendices did you
23 review?

24 **A** Well, my version of the report must have
25 Appendix A because I -- I did review background

1 **information, you know, the background and**
2 **qualifications of -- of Dr. Till, but I believe**
3 **that I -- my version did not have any of the other**
4 **appendices.**

5 Q So you thought you had Exhibit A?

6 A **A --**

7 Q Appendix A.

8 A **Appendix A, yes.**

9 Q Okay. So you, sitting here today,
10 definitely recall reviewing Appendix A; is that
11 correct?

12 A **I definitively recall reviewing**
13 **Dr. Till's experience and qualifications. And I**
14 **see here that that's -- his curriculum vitae is**
15 **listed in Appendix A, so I'm -- I'm pretty certain**
16 **that that's where I reviewed his qualifications.**

17 Q Pretty certain but not certain. You
18 might have got it off the internet or something?

19 A **Well, there's also information about --**
20 **about his qualifications in Section 1. But, no, I**
21 **know I didn't get it off the internet, so I'm**
22 **pretty sure that I had a copy of Appendix A.**

23 Q Did you have any of the information
24 concerning the models that were run by Dr. Till
25 and his team?

1 **A Yes.**

2 Q What information was that?

3 **A It's the information that's discussed in**
4 **some detail in the body of this report.**

5 Q So you had the information that's in the
6 body of the report?

7 **A Yes.**

8 Q Okay. So you -- you utilized this
9 report in calculating your air emissions at Latty
10 Avenue and your effluent guidelines.

11 Can you identify specifically what --
12 what you used?

13 **A Yes. I'll show you Table 3 of my report**
14 **is the calculations that I conducted for**
15 **calculating or estimating the effluent**
16 **concentrations of individual radionuclides from**
17 **the drying operation.**

18 Q Okay. And where in Dr. Till's report
19 were these numbers derived from?

20 **A I can show you that. Let me find my**
21 **specific reference.**

22 Q And I'd also like you to show me in your
23 report where you identify it.

24 **A Okay. (Peruses document.)**

25 **Okay. So if you'll go to page 17 of my**

1 **report, I discuss citing both Table 4-33 and**
2 **Table 4-34.**

3 Q Okay. Let's go to 4-33.

4 **A Yeah.**

5 Q What did you use from Table 4-33?

6 **A I used the -- the compilations provided**
7 **here of PM10 releases from the dryer operation**
8 **that's separated out by quarter and by waste type,**
9 **in particular, the Congo raffinate versus the**
10 **Colorado raffinate.**

11 Q Okay. So looking at Table 4-33, in the
12 left column, it says "Year-end quarter," correct?

13 **A Correct.**

14 Q And you have quarters there from the
15 third quarter of 1967 going down through the
16 fourth quarter of 1968, Total Campaign, 1. You
17 have a subtotal there.

18 **A Right.**

19 Q Correct?

20 Who was operating the dryer during those
21 quarters?

22 **A I don't specifically know who was**
23 **operating the dryer during those quarters.**

24 Q Did you use information from those
25 quarters to form your opinions regarding effluent

1 limits while Cotter was operating?

2 **A** Well, what I've done here is I've used
3 this data to estimate effluent limits for each of
4 these quarters. I haven't allocated or made an
5 opinion about who was operating at each of those
6 times.

7 Q Okay. And where in your table do you
8 identify the exceedances in your report?

9 **A** The exceedances are shaded in the bottom
10 part of Table 3.

11 Q Okay. So you've identified exceedances
12 in what's -- seems to be labeled as B of the
13 Table 3 in your report?

14 **A** Correct.

15 Q Which says "Concentrations released,"
16 and it lists "Radionuclides" underneath that,
17 correct?

18 **A** That's correct.

19 Q Okay. And with respect to -- which
20 radionuclides did you identify exceedances?

21 **A** I identified principally thorium-230,
22 but there are also estimated exceedances of
23 protactinium-231.

24 Q Okay. And when did those exceedances of
25 protactinium-231 occur?

1 **A** According to my calculations, in the
2 second and third quarters of 1968.

3 **Q** Okay. In your report you refer to
4 10.25 tons on page 17.

5 **A** Yes.

6 **Q** How did you utilize that figure?

7 **A** In terms of the calculations that are --
8 that are found in Table 3?

9 **Q** Correct.

10 **A** I used that as -- as really kind of a
11 baseline. So that -- that's an analysis that
12 Dr. Till made, and I used that really as the
13 total, the total amount of material that was
14 released. It's really no different than the data
15 that's tabulated in Table 4.33. So -- the data in
16 Table 4.33 is -- is accurately reproduced at the
17 top, along the top couple of rows of my Table 3.
18 That's really where the mass or the tonnage comes
19 in.

20 **Q** Did you use the 10 -- 10.25 figure in
21 your calculations?

22 **A** Not specifically. I mean, that's --
23 that's just the total of these values that are
24 summed up in Table 4-33.

25 **Q** What type of assumptions did your

1 calculations make?

2 MR. McCLAIN: What type of assumptions?

3 That's a pretty broad question.

4 MR. MCGAHREN: I'm trying to discover
5 what assumptions he made.

6 MR. McCLAIN: I understand, but I'm just
7 saying that the question as stated is pretty broad
8 without much direction.

9 Is there specific -- are there specific
10 things you want to know?

11 BY MR. MCGAHREN:

12 Q Can you answer the question, sir?

13 A I can.

14 One of the assumptions we've already
15 talked about, the assumption that the grain size
16 distribution that was measured for uranium mine
17 tailings would be appropriate and reasonable to
18 use in this case.

19 Another assumption that I've made in
20 these calculations is that the emission factors
21 for mineral processing are appropriate for this
22 kind of operation. That's an assumption that
23 Dr. Till made, and I considered that assumption
24 and I concurred that that was reasonable.

25 All of these things are -- you know, all

1 these operations are different. A gravel site is
2 going to be different from a waste drying site.
3 But there are emission factors and equations that
4 are used for calculating air emissions, and that's
5 an assumption I made, that those factors were
6 appropriate for this operation.

7 Q But you didn't attempt to run AERMOD to
8 actually take Dr. Till's information and do your
9 independent calculations -- do any independent
10 calculations?

11 A There are some independent calculations
12 here. And this isn't really AERMOD that Dr. Till
13 was using. These are equations from EPA guidance.
14 But I did review Dr. Till's approach, I agreed
15 that it was a reasonable approach, and I did use
16 his results.

17 Q Did you assume the size of the site?

18 A I guess you could call that an
19 assumption. I mean I -- I incorporated the size
20 of the site into my calculations.

21 Q How big a site did you incorporate into
22 your calculations?

23 A That's tabulated here.

24 Q Show me where.

25 A Okay. If you go to page 18 of my

1 **report, I described the size of the Latty Avenue**
2 **site as 10.46 acres.**

3 Q Did you assume that the site was
4 206 meters in length?

5 A Well, I assumed that that was a
6 reasonable modeling length. The -- the standard
7 protocol is to take the square root of the size.

8 Q Did you assume it had a certain height?

9 A For my own calculations, I assumed that
10 the air mass that I was evaluating had a thickness
11 of 10 meters.

12 Q Did you assume any instant distribution
13 of contamination through this box that you
14 created?

15 A I assumed a uniform distribution.

16 Q Instantly, correct?

17 A Instantly?

18 Q Yes.

19 A Well, continuously. I mean, we can look
20 at that as an average really, but for the purposes
21 of these calculations, I -- I assumed uniform
22 mixing.

23 Q Would you describe this as a box model?

24 A Sure. I would describe this as a box
25 model.

1 Q Does the site actually have that shape?

2 MR. McCLAIN: Come on.

3 THE WITNESS: Well, it has those -- it
4 has those dimensions. I mean it is 10.46 acres,
5 or was. So it's not -- it's not precisely a box;
6 you know, a four-sided box. But it's a reasonable
7 assumption for calculating the volume of air
8 that's blowing over the site, and that's what I
9 was using these dimensions for.

10 BY MR. MCGAHREN:

11 Q Did you make any assumptions concerning
12 temperature?

13 A There's -- there's no explicit
14 assumptions about temperature in my calculations.

15 Q Did you perform any validation on your
16 box model?

17 A Well, I mean, I would be -- I would have
18 been happy to do that, but this is a situation
19 oftentimes when we're stuck with doing modeling,
20 what we're trying to do is fill in data gaps,
21 either temporal or spatial data gaps. So we -- we
22 don't have a lot of measurements from the time
23 that the dryer was operating of particulate
24 concentrations at the fence line. As a matter of
25 fact, I'm not aware of any.

1 So I would be pleased to be able to do
2 some validation, but I couldn't find any data to
3 validate against.

4 Q Why didn't you use a Gaussian plume
5 model?

6 A Well, what I was trying to do is -- is
7 come up with a reasonably achievable estimate of
8 these effluent limitations. There are, you know,
9 lots of ways that this could have been done. A
10 Gaussian plume model would have been much more
11 complex, but -- and I thought about doing, you
12 know, different types of approaches. But what I
13 decided was that given the uncertainties with
14 regard to the paucity of data, that more complex
15 modeling or calculation efforts might seem more
16 precise, but they really wouldn't be more
17 accurate.

18 Q But your calculations were based on a
19 Gaussian plume model run by Dr. Till, correct, or
20 his team?

21 A Well, it was -- it was based on a series
22 of calculations that were estimating emissions
23 from a mineral processing facility.

24 Q Can you identify any other project
25 involving a regulatory agency where you used this

1 methodology for evaluating compliance?

2 **A** **Yeah, I've used comparable**
3 **methodologies. One example is I've faced the**
4 **challenge in the past of needing to calculate the**
5 **mass of contamination in some -- some area, say,**
6 **groundwater contamination in a plume or a soil**
7 **contamination at a site, and we use very similar**
8 **calculations like this where we're trying to get a**
9 **reasonable estimate considering the limitations**
10 **that we have on the data.**

11 **Q** **How about for a hot, high velocity point**
12 **source, have you ever used it for that purpose?**

13 **A** **No, I haven't.**

14 **Q** **Have you ever heard of anyone using it**
15 **for that purpose?**

16 **A** **Well, I'm not sure the -- the actual**
17 **source is relevant, because what I'm doing here**
18 **is, is I'm converting the results of a more**
19 **complex analysis into the concentration units that**
20 **we needed to compare against the effluent**
21 **limitations.**

22 **So if I think of Exide lead, we actually**
23 **did something kind of similar to that, but I don't**
24 **know if that falls into your category of a hot**
25 **point source, but although there are fugitive**

1 emissions, these were, you know, emissions out of
2 a stack, and they were high temperature emissions.

3 And one of the things that -- that I did
4 as part of my assignment for Exide is try to
5 understand, given the amount of emissions, the
6 amount of lead in emissions that we know or could
7 estimate had occurred over the operational life,
8 what sort of mass, how many tons, how many
9 kilograms of lead could there be or even should
10 there be out in the neighborhood where
11 contaminated soils were found.

12 So it's a different kind of box, but
13 it's still a box model.

14 Q So you applied this box model at the
15 Exide site in California; is that correct?

16 A Yes. I mean, it's not the exact same
17 model because we were looking for a different
18 endpoint.

19 Q And you submitted this analysis to a
20 regulatory agency?

21 A No, it's not submitted to a regulatory
22 agency. It's -- it's something I -- that I worked
23 on on behalf of the Technical Advisory Committee.
24 It's something that we discussed at advisory
25 meetings and public meetings, but it's not in a

1 **report.**

2 Q Okay. But my question pertained to
3 submissions to regulatory agencies for purposes of
4 determining compliance. Did you not understand
5 that?

6 MR. McCLAIN: You know, John, the way
7 you say things, it's kind of insulting sometimes.

8 MR. MCGAHREN: No, I'm just trying to
9 make sure he understands my question.

10 MR. McCLAIN: When you say, Didn't you
11 understand that? it's condescending and it's rude.
12 We've been here a long time, and we don't need
13 that kind of comment this late in the day.

14 BY MR. MCGAHREN:

15 Q I apologize if you feel that I was rude
16 to you, sir. That wasn't my intent. I want to
17 make sure that you understand my question.

18 My question is very specifically
19 tailored toward whether or not you've done this
20 type of analysis and submitted it to a regulatory
21 agency for purposes of establishing compliance.

22 **A I've done this kind of analysis for**
23 **different purposes at sites that were regulated by**
24 **various agencies, but not for the purposes of**
25 **compliance.**

1 Q And that's the purpose of your analysis
2 here, correct?

3 A Well, the way I would look at it is the
4 purpose of -- of this analysis is to arrive at an
5 estimate of concentrations. And then from there,
6 there's a second step, which is, is this in
7 compliance or is it not?

8 So my purpose was to take the
9 information that we have available, as sparse as
10 it is, and -- and arrive at a scientifically
11 reasonable estimate of these effluent
12 concentrations.

13 Q Did you perform your analysis for any
14 radionuclides other than radon, thorium-230 and
15 protactinium-241?

16 A Yes. I performed this analysis for the
17 whole list of radionuclides that are tabulated on
18 Table 3.

19 Q Okay. But the ones I mentioned are the
20 ones where you opine that they exceeded the
21 relevant effluent limitation for air at Latty
22 Avenue, correct?

23 A Can you read your list again?

24 Q My list included radon, thorium-230, and
25 protactinium-241.

1 **A Oh. That's correct.**

2 MR. McCLAIN: Now, John, you expressed
3 concern that if we went beyond 5:30, that you
4 would not be offering your best testimony. Are
5 you all right?

6 MR. McGAHREN: I'm almost done, Ken.

7 THE WITNESS: I would love to get out --
8 out of here by about 6:00, but I'm doing fine.

9 MR. McGAHREN: We'll definitely be out
10 of here, unless these folks have more questions,
11 by 6:00.

12 BY MR. McGAHREN:

13 Q How far apart are the SLAPS and the
14 Latty Avenue site?

15 **A I don't know the exact distance, but**
16 **they're maybe two miles apart.**

17 Q Could you pull up your supplemental
18 report, Dr. Wells. I think it's marked for
19 identification already as Exhibit 13.

20 **A Oh, here it is.**

21 Q Can I refer you to page -- Section 2. I
22 don't think it's paginated.

23 **A Yes, I'm with you.**

24 Q You say there -- in the first paragraph,
25 about six lines down: "Some of the material was

1 then dried and shipped to Cotter Corporation's ore
2 processing milling in Canon City, Colorado."

3 Do you see that?

4 **A Yes.**

5 Q Do you know -- did you look at, by mass,
6 the volume of materials that were shipped to Canon
7 City? Or the percentage of materials shipped to
8 Canon City?

9 **A No, I -- I didn't specifically know**
10 **that. I mean -- I mean, my understanding is that**
11 **all of the waste materials that were stored at**
12 **Latty Avenue site, except the leached barium**
13 **sulfate, were transported to Cotter's facility.**

14 Q Let me refer you to supplemental opinion
15 number 1 on -- it's not on a page. It's just says
16 "Supplemental Opinion 1."

17 **A Sorry about that. I'm not sure why it's**
18 **not paginated.**

19 Q You refer there to the Division of Air
20 Pollution Control of the St. Louis County Health
21 Department. Do you see that?

22 **A Yes.**

23 Q Now, I thought you testified earlier,
24 but I wasn't clear just because I didn't hear the
25 answer, did you review their files?

1 **A No. I reviewed this -- well, a**
2 **description of this violation.**

3 **Q Okay. So you reviewed historic**
4 **correspondence; is that correct?**

5 **A That's correct, in the form of a**
6 **bimonthly monitoring report that was submitted in,**
7 **I think it was 1970, to Cotter.**

8 **Q Okay. When this letter was sent to**
9 **Cotter, do you know how long it took Cotter to**
10 **respond to the St. Louis County Health Department?**

11 **A Well, I know that they were asked to**
12 **respond within five days. I -- I don't think I**
13 **have any information as to whether they met that**
14 **tight deadline, but I know that the RETA letter**
15 **from 1970 does specify that they responded**
16 **promptly.**

17 **Q Within the five-day time frame, correct?**

18 **A I don't think it says that, but --**
19 **but -- so I don't know specifically know if they**
20 **responded within five days.**

21 **Q Okay. You say the November 1970 report**
22 **is the only bimonthly report from RETA that's been**
23 **uncovered during discovery for this case; is that**
24 **correct?**

25 **A Well, that's the only bimonthly report**

1 **that I'm aware of.**

2 Q It's the only one you reviewed?

3 A **Correct.**

4 Q Okay. So you don't know if there are
5 others or not; is that correct?

6 A **That's really what I'm trying to say**
7 **here in this report.**

8 Q You say the facility received a notice
9 of noncompliance from AEC in 1968. Do you see
10 that?

11 A **Yes.**

12 Q Are you referring to inspection reports
13 that were written by AE -- AEC inspectors?

14 A **In that case, yes, that's a 1968**
15 **inspection report that I'm referring to.**

16 Q Okay. Are you familiar with the AEC's
17 enforcement process?

18 A **Not in any detail, no.**

19 Q Are you familiar with it at all?

20 A **Well, I'm -- I'm familiar that they used**
21 **inspections. You know, that they use inspections**
22 **to -- to evaluate sites, they identify problems,**
23 **and then they, among other things, look to see**
24 **upon their next inspection if those problems have**
25 **been corrected.**

1 Q Can you describe for me the steps that
2 the AEC took for citing a licensee for a
3 violation?

4 A I haven't seen any documentation about
5 what steps, if any, they took after -- after
6 citing these noncompliance events.

7 Q And you don't have any professional
8 experience with respect to that process?

9 A I just don't have an opinion about that
10 process.

11 Q Well, you described the facility
12 receiving a notice of noncompliance.

13 A Correct.

14 Q What do you -- what do you mean when you
15 say a "notice of noncompliance"?

16 A Well, what I mean by that is there's --
17 there's language in this inspection report that
18 says that the facility is not in compliance.

19 Q Did they send the inspection report to
20 the licensee, do you know?

21 A I would assume so. But I know I'm not
22 meant to assume, so the answer is I don't know.

23 Q You say further down: "The facility
24 also received notices of noncompliance from the
25 Atomic Energy Commission in 1966 and '67."

1 Do you see that?

2 **A Yes.**

3 Q Are you referring to the same thing, an
4 inspection report that you reviewed?

5 **A Those are inspection reports, yes.**

6 Q Okay. Who was operating the facility in
7 1966?

8 **A I don't specifically know.**

9 Q Do you know who the licensee was?

10 **A Well, we -- we have this license**
11 **information. So I -- I believe the licensee would**
12 **have been Contemporary Metals.**

13 Q But your opinion is that Cotter
14 committed multiple violations related to hazardous
15 material management, and you're using '66 and '67
16 inspection reports to support your opinion,
17 correct?

18 **A Correct.**

19 Q Why is that?

20 **A Well, because I'm guided by an**
21 **assumption that Cotter is or may be held**
22 **responsible for activities at the site during the**
23 **operational period of the Latty Avenue site.**
24 **That's -- that's an assumption that I'm using in**
25 **this report.**

1 Q What is the basis for that assumption?

2 A The basis for that assumption is that --
3 really the similar basis to my allocation scheme.
4 I was -- I was asked to assume that operators at a
5 site could be held responsible for all releases
6 or -- or violations over the operational period of
7 that site.

8 Q And, again, what is the basis for that
9 assumption? Is it something that counsel told you
10 or --

11 A Yes.

12 Q Okay. Can I refer you to your third
13 supplemental opinion.

14 A Yes.

15 Q On the second page of that opinion,
16 which I -- I don't have a page number, but it
17 starts at the top, it says "Scheduling Order."

18 Do you see that?

19 A Okay. Yeah.

20 Q It's the second to last page of the
21 supplemental report. Two lines down, it says:
22 "It is my opinion that releases of contaminated
23 soil and sediment into Coldwater Creek and its
24 tributary ditches meet the definition of the
25 'release of excessive radiation' as defined in

1 10 CFR Section 20."

2 What is the basis for that opinion?

3 **A The basis for that opinion is that these**
4 **releases were in excess of -- resulted in**
5 **contamination that was in excess of background,**
6 **and also was the result of releases that were**
7 **really not in compliance with the regulatory**
8 **requirement to keep releases as low as reasonably**
9 **achievable.**

10 Q Is there anywhere in the regulations
11 that pertained at the time Cotter was operating
12 the facility that talk about releases in excess of
13 background?

14 **A Not that I'm aware of.**

15 Q So this is just purely your opinion. It
16 has nothing to do with the regulations, correct?

17 **A This is my opinion of -- of the**
18 **definition of "excessive radiation."**

19 Q So any release above background is a
20 violation of the regulations in your opinion; is
21 that correct?

22 **A Well, any release above background that**
23 **also exceeds effluent limitations or that exceeds**
24 **the narrative description of -- of release**
25 **requirements; this, you know, as low as reasonably**

1 **achievable.**

2 **So there -- there are a couple of steps**
3 **there. Not any molecule that leaves a site is**
4 **necessarily a violation. I -- I acknowledge that.**

5 Q With respect to Cotter's operation of
6 the Latty Avenue facility from 1970 on, did you
7 identify any such -- any evidence or documents or
8 information evidencing releases that you define as
9 "excessive radiation"?

10 A **I would define the releases of**
11 **thorium-230 in air as meeting that definition of**
12 **"excessive radiation," because it exceeds the**
13 **effluent limitation in accordance with my**
14 **calculations.**

15 Q Any others?

16 A **Those are all that I would be aware of.**

17 Q Okay. And those releases are based on
18 your box model calculation, which is also premised
19 on Dr. Till's team's work and calculations,
20 correct?

21 A **That's correct. And it's my opinion**
22 **that that's a reasonable approach for making such**
23 **a calculation.**

24 Q And again, you -- you cite in your
25 supplemental opinion number 3: "Mallinckrodt and

1 Cotter would have been aware of this issue because
2 AEC had observed and reported uncontrolled
3 releases of contaminated sediment at least by
4 1948."

5 Is that based upon your opinion that
6 Cotter reviewed the 1980 -- '48 report?

7 **A No, I don't have a specific opinion**
8 **about whether or not they reviewed that specific**
9 **report. But I do have an opinion that they should**
10 **have been or would have been aware of offsite**
11 **releases that resulted in contamination into the**
12 **creek.**

13 Q They were aware -- your opinion is that
14 they were aware of releases by prior operators of
15 Latty Avenue? Is that your opinion?

16 **A No, that's not specifically my opinion,**
17 **but that -- that the operational practices from**
18 **each of these sites resulted in contamination**
19 **extending off the property, and that both entities**
20 **should have been aware of that.**

21 Q Do you know if there was contamination
22 extending off of the Latty Avenue property before
23 Cotter stepped foot on the site?

24 **A Yes, I believe there was. Well, I don't**
25 **know exactly when Cotter stepped foot on the site,**

1 **so I -- I guess I really should correct my answer.**

2 **I -- I don't know the answer to that question.**

3 Q Okay. Bear with me a second. I don't
4 think I have anything else at this time.

5 Oh, let me refer you to page 21 of your
6 report.

7 **A Okay. I'm on page 21.**

8 Q The first full paragraph begins "In some
9 cases." If you go down about six lines where
10 you're talking about allocation, it says, over on
11 the right side of that sixth line, "... apply in
12 the Coldwater Creek because the very same
13 materials were stored at each site, although they
14 were stored at each site at different times."

15 Is that correct? Or do you want to
16 modify your testimony -- or your opinion? Excuse
17 me.

18 **A No, that's -- that's correct. The same**
19 **materials -- I mean the materials that ended up at**
20 **Latty Avenue came from SLAPS. So it's the very**
21 **same materials.**

22 Q Okay. So that's the sentence you're
23 referring to?

24 **A Yes.**

25 Q You're not saying that there weren't

1 additional materials at SLAPS, correct?

2 **A I'm not saying that.**

3 Q So, like, for example, the K-65 waste,
4 you're not saying that was at Latty Avenue, are
5 you?

6 **A I'm not saying the K-65 waste was at**
7 **Latty Avenue. I'm not prepared to make that same**
8 **distinction about the drums. I know that the**
9 **drums that were stored -- at least many of the**
10 **drums that were used to store the K-65 waste**
11 **were returned back to the SLAPS site.**

12 I also know that Latty Avenue had a drum
13 storage site. I haven't seen any specific
14 description of where those drums came from or --
15 or what was in them, but -- and it's not really,
16 you know, related to my specific opinions, but it
17 seems to me that that's -- from the knowledge that
18 I have about this site, that's an unknown.

19 Q Didn't you see a bill of sale today that
20 you were shown by counsel for Mallinckrodt that
21 identified how many drums were transferred to
22 Latty Avenue?

23 **A Yeah, but it doesn't -- I mean, it talks**
24 **about drums, but it doesn't say what was in the**
25 **drums.**

1 Q Do you have any idea the number of drums
2 that were stored at SLAPS?

3 **A Oh, many, many drums.**

4 Q In excess of 50,000?

5 MR. ZAGER: Object to form and
6 foundation.

7 THE WITNESS: Well, it was certainly
8 thousands.

9 BY MR. MCGAHREN:

10 Q Okay. Do you -- is it your opinion that
11 the -- those drums were ever stored at Latty
12 Avenue?

13 **A Well, certainly not all of those drums**
14 **were stored at Latty Avenue, but there were drums**
15 **that were stored at Latty Avenue. There were**
16 **measurements from the drum storage site that**
17 **showed quite high levels of gamma radiation.**

18 So all I'm saying is, from my
19 **reconstruction of the history of these sites, what**
20 **happened to the empty drums is -- is something**
21 **that I, sitting here today, am not clear on.**

22 Q Can I refer you to page 20 of your
23 report.

24 **A Yeah.**

25 MR. McCLAIN: You guys had better go.

1 BY MR. MCGAHREN:

2 Q The last sentence of the first full
3 paragraph says: "In this case, however, when the
4 drying operations were active at Latty Avenue, a
5 substantial amount of contaminated dust was
6 mobilized, some of which would have been deposited
7 on the ball fields. I believe it's reasonable to
8 apportion 10 percent of the total contaminant load
9 found on the ball fields after 1966 to Latty and
10 90 percent to SLAPS."

11 What's the basis for that estimate?

12 A Well, this is -- this is clearly a
13 semi-quantitative estimate.

14 Q Otherwise, known as a lag.

15 A No, I think it's better than that.

16 You know, what -- what one does here,
17 and what I'm trying to do here, is arrive at a
18 reasonable allocation scheme based on the
19 information we have. There are -- there are a lot
20 of data gaps, and yet you still need an answer.

21 And so my -- I would freely acknowledge
22 that there's uncertainty in that particular
23 assumption or conclusion. But my -- my basic
24 premise is, due to its proximity, surely most of
25 the contamination that's found at the ball field

1 **came from SLAPS.**

2 But given that we know that there were
3 offsite releases into the air, given we know that
4 once contaminants get into the air, they are
5 transported with the wind, and given the fact that
6 wind directions are variable, that some
7 contamination from Latty Avenue, in my opinion,
8 ended up on the ball fields, although much less
9 than -- than what would have been derived from
10 **SLAPS.**

11 Q But you don't know how far apart the
12 sites are, do you?

13 MR. McCLAIN: He's already given you his
14 estimate.

15 THE WITNESS: Yeah, they're -- they're
16 approximately two miles apart.

17 BY MR. McGAHREN:

18 Q Are you sure about that?

19 **A Yeah.**

20 Q Okay. And do you know the prevailing
21 wind directions between --

22 MR. McCLAIN: Come on.

23 BY MR. McGAHREN:

24 Q -- Latty Avenue and SLAPS?

25 MR. McGAHREN: No, Ken, it's not "come

1 on."

2 THE WITNESS: No, I -- I don't know the
3 prevailing wind direction.

4 BY MR. MCGAHREN:

5 Q Do you think that's an important factor?

6 A Well, if one was trying to do a more
7 detailed analysis, if you had the data that --
8 that would be necessary to do a more detailed
9 analysis, then, sure, the wind directions and the
10 variability of wind directions would come into
11 play.

12 I would submit that for some of these
13 estimates that we're -- that I'm coming up with
14 that folks in this case are looking at, there's
15 kind of a false sense of security if you try to
16 use highly complex modeling, like AERMOD, for an
17 analysis like this where a lot of the input
18 parameters aren't available.

19 Q But there's no calculations in your
20 report that support that apportionment for the
21 ball field, are there?

22 A It's -- it's not an apportionment
23 that -- that relies on calculations.

24 Q Okay. And one more question, on
25 page 17.

1 **A Yes.**

2 Q It talks about air releases from Latty
3 Avenue. The second line down, it says: "To
4 reduce shipping costs, operators at Latty Avenue
5 decided to remove moisture from the waste."

6 Where did you get that information from,
7 "to reduce shipping costs"?

8 **A That's described in -- in the AEC**
9 **inspection report, and I think that's -- I -- it's**
10 **my understanding that that -- that is the reason**
11 **that drying was done.**

12 Q So it's in an inspection report in --
13 that you've identified in your annotations.

14 **A I believe so.**

15 Q Okay. No other source of that?

16 **A Other than it making sense, you know,**
17 **other than I can't think of any other reason that**
18 **they would have done that.**

19 Q Are you familiar with the Department of
20 Transportation regulations for shipment of
21 radionuclides?

22 **A Well, I know that they shipped a lot of**
23 **radionuclides from that site without drying. So I**
24 **don't believe that that was a prohibition based on**
25 **transportation restrictions.**

1 Q That wasn't my question.

2 MR. McGAHREN: You can strike that --
3 move to strike that answer as nonresponsive.

4 I have no further questions at this
5 time.

6 MR. ZAGER: I don't have anything
7 further.

8 MR. McCLAIN: Thank you.

9 MR. McGAHREN: Thank you very much,
10 Dr. Wells.

11 MR. ZAGER: Are you going to read and
12 sign, I'm assuming?

13 MR. McCLAIN: Yes.

14 MR. McGAHREN: Thank you, Ken.

15 MR. McCLAIN: You're welcome.

16 (A discussion was held off the record.)

17 THE VIDEOGRAPHER: Going off the record.
18 The time is 5:54 p.m.

19 (Conclusion of video record.)

20 THE REPORTER: John, would you like a
21 copy of the transcript?

22 MR. McGAHREN: Yes, I want the full,
23 mini.

24 THE REPORTER: And how about the
25 exhibits?

1 MR. McCLAIN: Yes, the exhibits too.

2 MR. ZAGER: We'll take the same.

3 MR. McCLAIN: And we will too.

4 MR. MCGAHREN: And we'll take the video
5 synced.

6 MR. McCLAIN: We don't need the video.

7 (Whereupon, the deposition of

8 JAMES T. WELLS, Ph.D. was concluded

9 at 5:55 p.m.)

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1 CERTIFICATE OF CERTIFIED SHORTHAND REPORTER

2 The undersigned Certified Shorthand Reporter
3 does hereby certify:

4 That the foregoing proceeding was taken before
5 me at the time and place therein set forth, at
6 which time the witness was duly sworn; That the
7 testimony of the witness and all objections made
8 at the time of the examination were recorded
9 stenographically by me and were thereafter
10 transcribed, said transcript being a true and
11 correct copy of my shorthand notes thereof; That
12 the dismantling of the original transcript will
13 void the reporter's certificate.

14 In witness thereof, I have subscribed my name
15 this date: October 25, 2019.

16
17 
18 LESLIE A. TODD, CSR, RPR

19 Certificate No. 5129

20

21 (The foregoing certification of
22 this transcript does not apply to any
23 reproduction of the same by any means,
24 unless under the direct control and/or
25 supervision of the certifying reporter.)

1 INSTRUCTIONS TO WITNESS

2 Please read your deposition over carefully and
3 make any necessary corrections. You should state
4 the reason in the appropriate space on the errata
5 sheet for any corrections that are made.

6 After doing so, please sign the errata sheet
7 and date it.

8 You are signing same subject to the changes
9 you have noted on the errata sheet, which will be
10 attached to your deposition. It is imperative
11 that you return the original errata sheet to the
12 deposing attorney within thirty (30) days of
13 receipt of the deposition transcript by you. If
14 you fail to do so, the deposition transcript may
15 be deemed to be accurate and may be used in court.

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2 E R R A T A

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4 PAGE LINE CHANGE

5 _____

6 REASON: _____

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12 REASON: _____

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14 REASON: _____

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24 REASON: _____

25

1 ACKNOWLEDGMENT OF DEPONENT

2 I, _____, do hereby
3 certify that I have read the foregoing pages, and
4 that the same is a correct transcription of the
5 answers given by me to the questions therein
6 propounded, except for the corrections or changes
7 in form or substance, if any, noted in the
8 attached Errata Sheet.

9

10

11 _____
JAMES T. WELLS, Ph.D.

DATE

12

13

14 Subscribed and sworn to

15 before me this

16 _____ day of _____, 20____.

17 My commission expires: _____

18

19 _____
Notary Public

20

21

22

23

24

25

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